City of Idaho Springs
Source Water Protection Plan

Clear Creek County, Colorado
October 17, 2016

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Colorado Rural Water Association

For the Community Water Provider:
City of Idaho Springs: ID # CO0110020

Cover Photo by City of Idaho Springs

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ACRONYMS

ARNF/PNG	Arapaho Roosevelt National Forest and Pawnee National Grasslands
AST	Above Ground Storage Tank
BLM	Bureau of Land Management
BMP	Best Management Practice
CCR	Consumer Confidence Report
CCWF	Clear Creek Watershed Foundation
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFS	Cubic Feet per Second
COC	Contaminant of Concern
CRWA	Colorado Rural Water Association
DOC	Dissolved Organic Carbon
DRMS	Division of Reclamation, Mining and Safety
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Administration
GIS	Geographic Information System
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
OEM	Office of Emergency Management
OWTS	Onsite Wastewater Treatment System
PSOC	Potential Source of Contamination
SDWA	Safe Drinking Water Act
SWAA	Source Water Assessment Area
SWAP	Source Water Assessment and Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
TMDL	Total Maximum Daily Load
UCCWA	Upper Clear Creek Watershed Association
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WBID	Water Body Identification
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division

EXECUTIVE SUMMARY

There is a growing effort in Colorado to protect community drinking water sources from potential contamination. Many communities are taking a proactive approach to preventing the pollution of their drinking water sources by developing a source water protection plan. A source water protection plan identifies a source water protection area, lists potential contaminant sources and outlines best management practices to implement to decrease risks to the water source. Implementation of a source water protection plan provides an additional layer of protection at the local level beyond drinking water regulations.

The City of Idaho Springs values a clean, high quality drinking water supply and decided to work collaboratively with area stakeholders to develop a Source Water Protection Plan. The source water protection planning effort consisted of public planning meetings and individual meetings with water operators during the months of June 2016 through October 2016 at the Idaho Springs City Hall in Idaho Springs, Colorado. During the development of this Plan, a Steering Committee was formed to develop and implement this Source Water Protection Plan. Colorado Rural Water Association was instrumental in this effort by providing technical assistance in the development of this Source Water Protection Plan.

The City of Idaho Springs obtains their drinking water from surface water intakes on Chicago Creek, and Devils Canyon. The Source Water Protection Area for this water source is the Chicago Creek watershed upstream from the City's intake. This Source Water Protection Area, in addition to the Soda Creek watershed, is the area that the City of Idaho Springs has chosen to focus its source water protection measures to reduce source water susceptibility to contamination.

The Steering Committee conducted an inventory of potential contaminant sources and identified other issues of concern within the Source Water Protection Area that may impact the City's drinking water sources. The Steering Committee prioritized the list of issues of concern as: wildland fire, runoff and spills on roads, abandoned mine lands, flooding, dam failure, future mining activity, dumping, development & septic systems, and reservoir maintenance.

The Steering Committee developed several best management practices that may help reduce the risks from the potential contaminant sources and other issues of concern. The best management practices are centered on the themes of building partnerships with community members, businesses, and local decision makers; raising awareness of the value of protecting community drinking water supplies; and empowering local communities to become stewards of their drinking water supplies by taking actions to protect their water sources.

At the completion of this plan, members of the Steering Committee will meet to develop an Action Plan of BMPs to implement during 2016-2017. It is recommended that this Plan be reviewed at a frequency of once every three years or if circumstances change resulting in the development of new water sources and source water protection areas, or if new risks are identified.

INTRODUCTION

The City of Idaho Springs operates a community water supply system that supplies drinking water to approximately 1,730 residents and businesses located within Clear Creek County, Colorado. The City of Idaho Springs obtains their drinking water from surface water intakes on Chicago Creek and Devils Canyon. The City recognizes the potential for contamination of the source of their drinking water, and realizes that it is necessary to develop a protection plan to prevent the contamination of this valuable resource. Proactive planning and implementing contamination prevention strategies are essential to protect the long-term integrity of their water supply and to limit their costs and liabilities.[1]

Table 1. Primary Contact Information for City of Idaho Springs

PWSID	PWS Name	Name	Title	Address	Phone
CO0110020	City of Idaho Springs	Andy Marsh	City Administrator	P.O. Box 907 1711 Miner St. Idaho Springs, CO 80452	303-567-4421 Ext. 121

Purpose of the Source Water Protection Plan

The Source Water Protection Plan (SWPP) is a tool for the City of Idaho Springs to ensure clean and high quality drinking water sources for current and future generations. This Source Water Protection Plan is designed to:

- Create an awareness of the community's drinking water sources and the potential risks to surface water and/or groundwater quality within the watershed;
- Encourage education and voluntary solutions to alleviate pollution risks;
- Promote management practices to protect and enhance the drinking water supply;
- Provide for a comprehensive action plan in case of an emergency that threatens or disrupts the community water supply.

Developing and implementing source water protection measures at the local level (i.e. county and municipal) will complement existing regulatory mandates implemented at the state and federal governmental levels by filling any gaps through local management strategies that are collaboratively developed.

[1] The information contained in this Plan is limited to that available from public records and the City of Idaho Springs at the time that the Plan was written. Other potential contaminant sites or threats to the water supply may exist in the Source Water Protection Area that are not identified in this Plan. Furthermore, identification of a site as a "potential contaminant site" should not be interpreted as one that will necessarily cause contamination of the water supply.

Protection Plan Development

The Colorado Rural Water Association's (CRWA) Source Water Protection Specialist, Mark Williams, helped facilitate the source water protection planning process. The goal of the CRWA's Source Water Protection Program is to assist rural and small communities served by public water systems to reduce or eliminate the potential risks to drinking water supplies through the development of Source Water Protection Plans, and provide assistance for the implementation of prevention measures.

The source water protection planning effort consisted of a series of public planning meetings and individual meetings (Table 2). Information discussed at the meetings helped the City of Idaho Springs develop an understanding of the issues affecting source water protection for the community. The Steering Committee then made recommendations for management approaches to be incorporated into the Source Water Protection Plan. In addition to the planning meetings, data and other information pertaining to Source Water Protection Area was gathered via public documents, internet research, phone calls, emails, and field trips to the protection area. A summary of the meetings is represented below.

Table 2. Planning Meetings

Date	Purpose of Meeting
April 18, 2014	Provided a presentation to the City Council on Colorado Rural Water Association's Source Water Protection Program and developing a protection plan for the City of Idaho Springs.
June 28, 2016	First Planning Meeting - Presentation on the process of developing a Source Water Protection Plan for the City of Idaho Springs. Review of the State's Source Water Assessment for Idaho Springs and the delineation of the source water protection area.
July 26, 2016	Second Planning Meeting – Developed an inventory of potential contaminant sources and issues of concern within the Source Water Protection Area. Steering Committee completed a SWAP Risk Assessment to prioritize the issues of concern.
August 23, 2016	Third Planning Meeting – Developed a list of best management practices to include in the SWPP to address the issues of concern and decrease risk to the source waters.
September 27, 2016	Fourth Planning Meeting - Review the written draft of the SWPP, make edits and set the date for the final edits and first plan implementation meeting.
October 27, 2016	Fifth Planning Meeting – Review final plan, create an action plan of the BMP's to implement during the next year, strategize grant spending.

Stakeholder Participation in the Planning Process

Source water protection was founded on the concept that informed citizens, equipped with fundamental knowledge about their drinking water source and the threats to it, will be the most effective advocates for protecting this valuable resource. Local support and acceptance of the Source Water Protection Plan is more likely where local stakeholders have actively participated in the development of their Protection Plan.

The City of Idaho Springs's source water protection planning process attracted interest and participation from 12 stakeholders including local citizens and landowners, water operators, local and county governments, and agency representatives (Table 3). During the months of June 2016 through October 2016, five stakeholder meetings were held at the City Hall in Idaho Springs to encourage local stakeholder participation in the planning process. Input from these participants was greatly appreciated.

Table 3. Table of Stakeholders Who Participated on the Steering Committee

Stakeholder	Title	Affiliation
Andy Marsh	City Administrator	City of Idaho Springs
John Curtis	City Council & Georgetown Water Operator	City of Idaho Springs
Ed Sigward	Water Operator	City of Idaho Springs
Bob Bowland	City Council	City of Idaho Springs
Alan Tiefenbach	Community Development Planner	City of Idaho Springs
Kelly Cline	Source Water Specialist	City of Westminster
Dan Wolf	Water/Wastewater Superintendent	City of Idaho Springs
Phyllis Adams	Secretary	Upper Clear Creek Watershed Association
Jim Ford	Engineer	City of Black Hawk
Lisa Leben	Special Projects Director	Clear Creek County
Dave Holm	Executive Director	Clear Creek Watershed Foundation
Deb Zack	Inactive Mines Reclamation Program Project Manager	Colorado Division Reclamation, Mining and Safety
John Bordoni	Public Works Manager	City of Idaho Springs

Development and Implementation Grant

The City of Idaho Springs has been awarded a $5,000 Development and Implementation Grant from the Colorado Department of Public Health and Environment (CDPHE) in May 2016. This funding is available to public water systems that are committed to developing and implementing a source water protection plan. The City intends on using this funding to implement management approaches that are identified in this Plan.

WATER SUPPLY SETTING

Location and Description

The City of Idaho Springs is a rural community located in Clear Creek County in the north-central front range of Colorado. The City of Idaho Springs is located at Latitude 39°42’45”N, Longitude 105°41’45”W at an elevation of 7,526 feet. Idaho Springs is situated along the Interstate Highway 70 corridor approximately 40 miles west of Denver. According to the U.S. 2010 Census Bureau, the town has a total area of 2.2 square miles (5.7 km^2), 904 occupied residential dwellings, and a population of 1,717 residents. The population in 2000 was 1,889 and had decreased 9.1% by 2010 with estimated 2015 population to be at about 1,728 (Wikipedia, 2016).

The City was founded in 1859 as the site of the first significant discovery of the Colorado Gold Rush. The City’s municipal affairs are governed by the Idaho Springs City Council. The county seat is located in the Town of Georgetown, 10 miles west of Idaho Springs.

The City obtains its drinking water supply from two surface water intakes off of Chicago Creek and Devils Canyon. The source water protection area includes the watersheds upstream from the City’s intakes and the Soda Creek watershed with its potential backup source (Fig. 1).

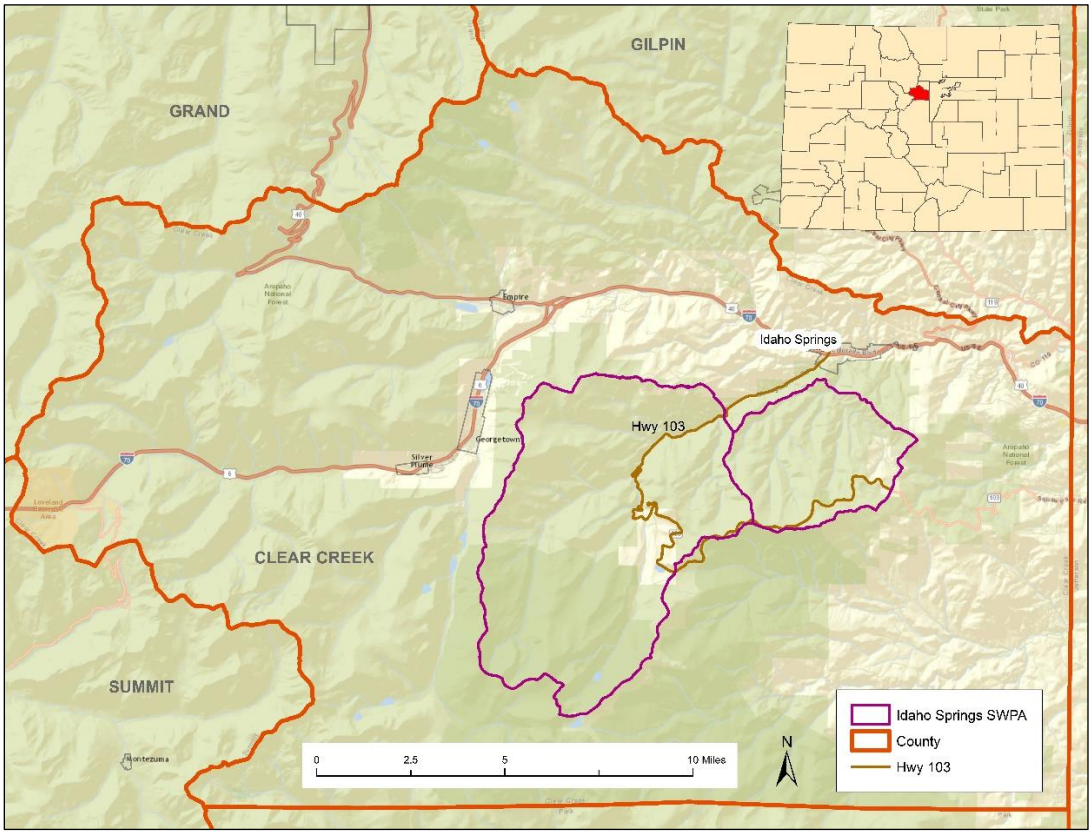


Figure 1. Regional setting map.

Physical Characteristics

The City of Idaho Springs's source water protection area, the Chicago Creek and Soda Creek watersheds, lie within the Southern Rocky Mountain province physiographic area that encompasses the center of the state and runs its entire north-south length. The Chicago Creek watershed is surrounded by high mountain peaks including Mt. Evans (14,271 feet), Rogers Peak (13,391 feet), Sugarloaf Peak (12,513 feet), Mount Warren (13,307 feet), Gray Wolf Mountain (13,602 feet), forming the southern boundary of the watershed along the Continental Divide (Fig. 2).

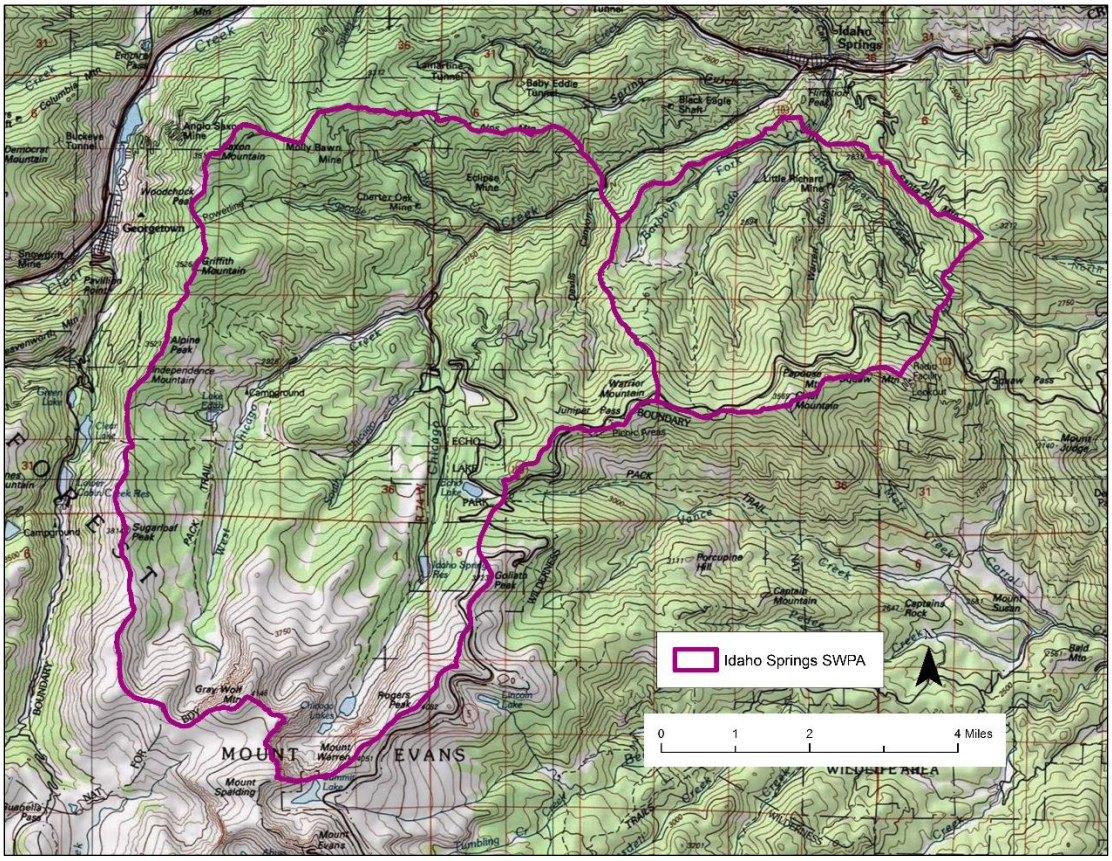


Figure 2. Topographic map of the Source Water Protection Area.

Ecological Regions

The source water protection area lies within the Montane or mid-elevation ecosystem and in the Subalpine and Alpine Ecosystems (Fig. 3). The Montane zone ranges from 8,000 to 10,000 feet and is dominated by pines, Douglas-fir and aspen. Ponderosa pine is more common on dry south-facing slopes. On north facing slopes Douglas fir may be the more dominant plant. Lodgepole pine and aspen are common at the upper elevations of the Montane (CSU Extension, 2016).

The Subalpine zone lies immediately below tree line, generally found between 10,000 and 11,000 feet. The subalpine forest is a transition zone from dense forest below to alpine tundra above tree line. Tree line is not really a line, but rather a zone where trees gradually get smaller and more stunted until conditions are too challenging for tree growth. A typical subalpine forest may consist mostly of subalpine fir, Engelmann spruce and Limber pine. Clark's nutcracker, golden eagle, red-tailed hawk, dusky grouse, mountain chickadee, and gray jay find habitat in this life zone, as well as cottontail rabbit, boreal toad, snowshoe hare, and Fremont squirrel (USP, 2015).

The Alpine Zone, the highest mountain zone starting at elevations of 11,000 to 11,500 feet, includes alpine meadows as well as steep, exposed rock and glaciated peaks. The alpine zone is a tundra community with a harsh environment and a short growing season. This life zone is characterized by the dominance of elk sedge, low willow, hairgrass meadow, and small fens and ponds. Strong winds, low temperatures, and shallow soils make this area especially vulnerable to the impacts of overuse. Supporting one of the largest alpine willow carrs in Colorado, this landscape is home to pika, bighorn sheep, mountain goat, and marmot as well as critical winter habitat and nesting grounds for white-tailed ptarmigan and nesting opportunities for rosey finch, water pipit, and whitecrowned sparrow (GPSBC, 2001).

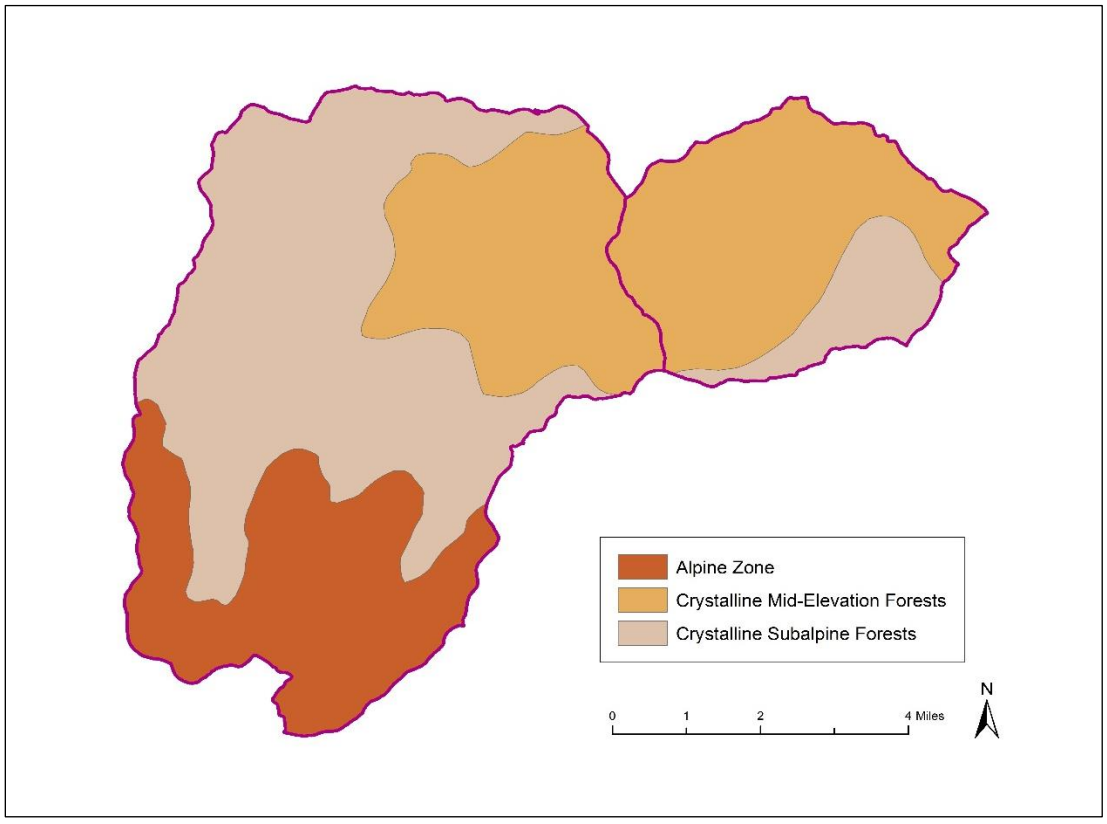


Figure 3. Map of the ecological zones within the Source Water Protection Area.

Climate

The climate within the Source Water Protection Area is dependent on elevation and location, with precipitation increasing moderately with altitude. Average annual precipitation ranges from about 18 inches in the lower watershed to about 39 inches in the higher mountains (Fig. 4). The majority of precipitation occurs during heavy spring snow and late summer monsoon rains. The county's high elevation and proximity to the continental divide play a major role in moderating summertime temperatures and deepening the chill of winter. Temperature also varies depending on elevations with average high temperature during July around 77 degrees Fahrenheit and average January lows around 15 degrees Fahrenheit (1971-2007 data) (CCCCWPP, 2008).

Most of the precipitation that falls on the land surface during storm events flows directly into drainages, streams, and rivers as runoff. Some of the water will infiltrate the soil and recharge the underlying fractured rock aquifers. The average runoff for the watershed is 20 inches at the top of the ridges and 5-10 inches in the lower watershed (Topper et al, 2003).

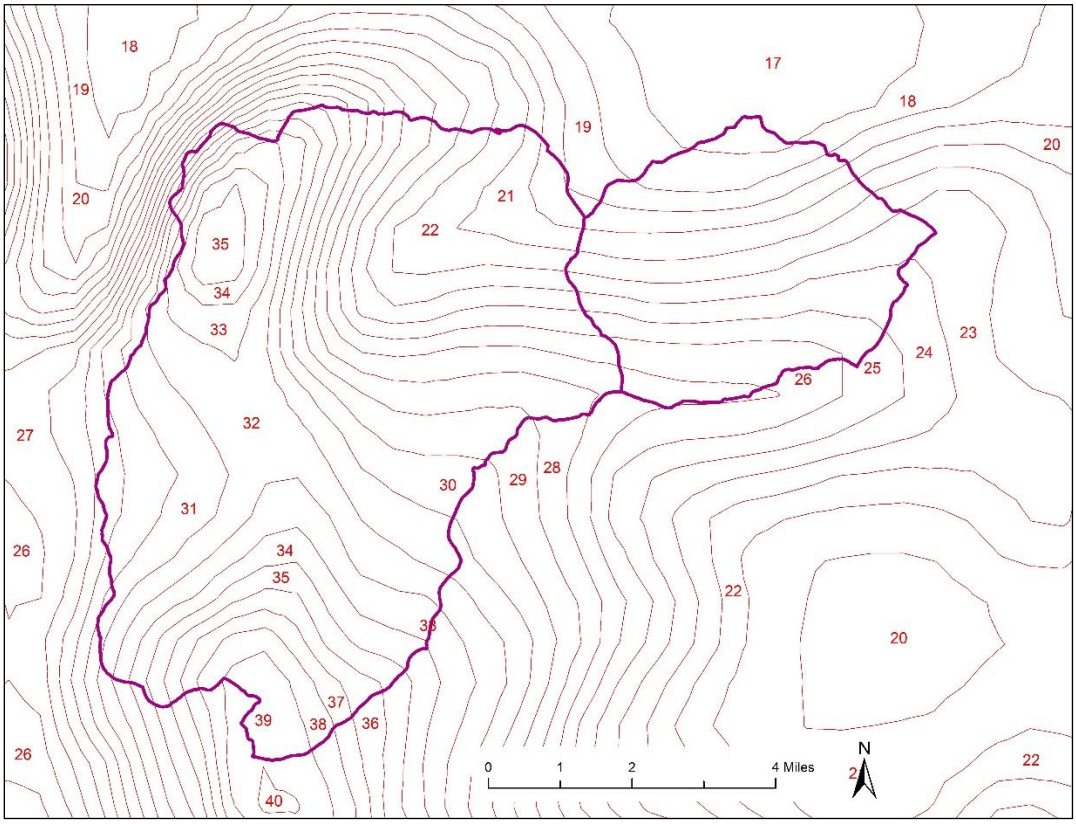


Figure 4. Average annual precipitation map of the Source Water Protection Area.

Land Ownership and Use

The Source Water Protection Area lies within both public and private lands. The private land includes land within the unincorporated areas of Clear Creek County. The public lands include Arapaho National Forest land managed by the Clear Creek Ranger District, and parcels owned by Idaho Springs and Clear Creek County. Authority over the lands remains with the individual agencies.

Land use includes sparse rural residential development, recreation (camping, hiking, climbing, fishing, mountain biking, x-country skiing, horseback riding, auto touring, sightseeing), big game hunting, old mine sites, grazing, wildlife habitat and other.

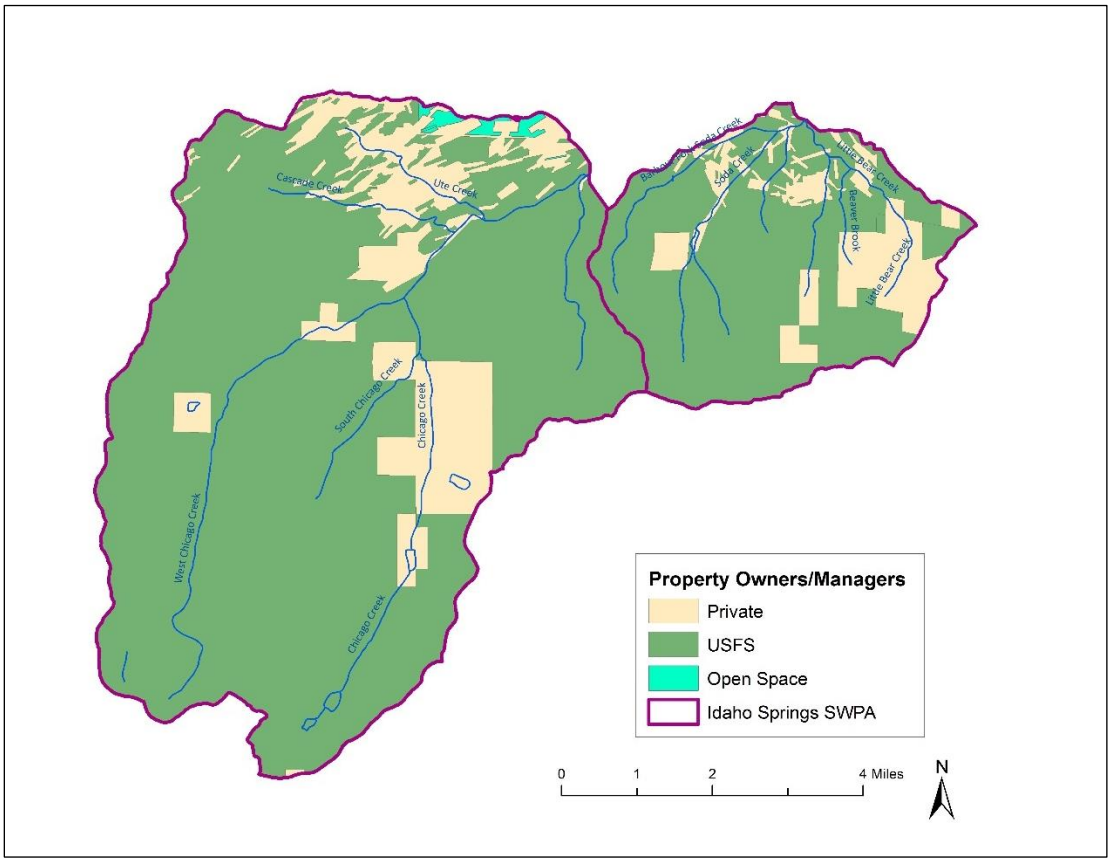


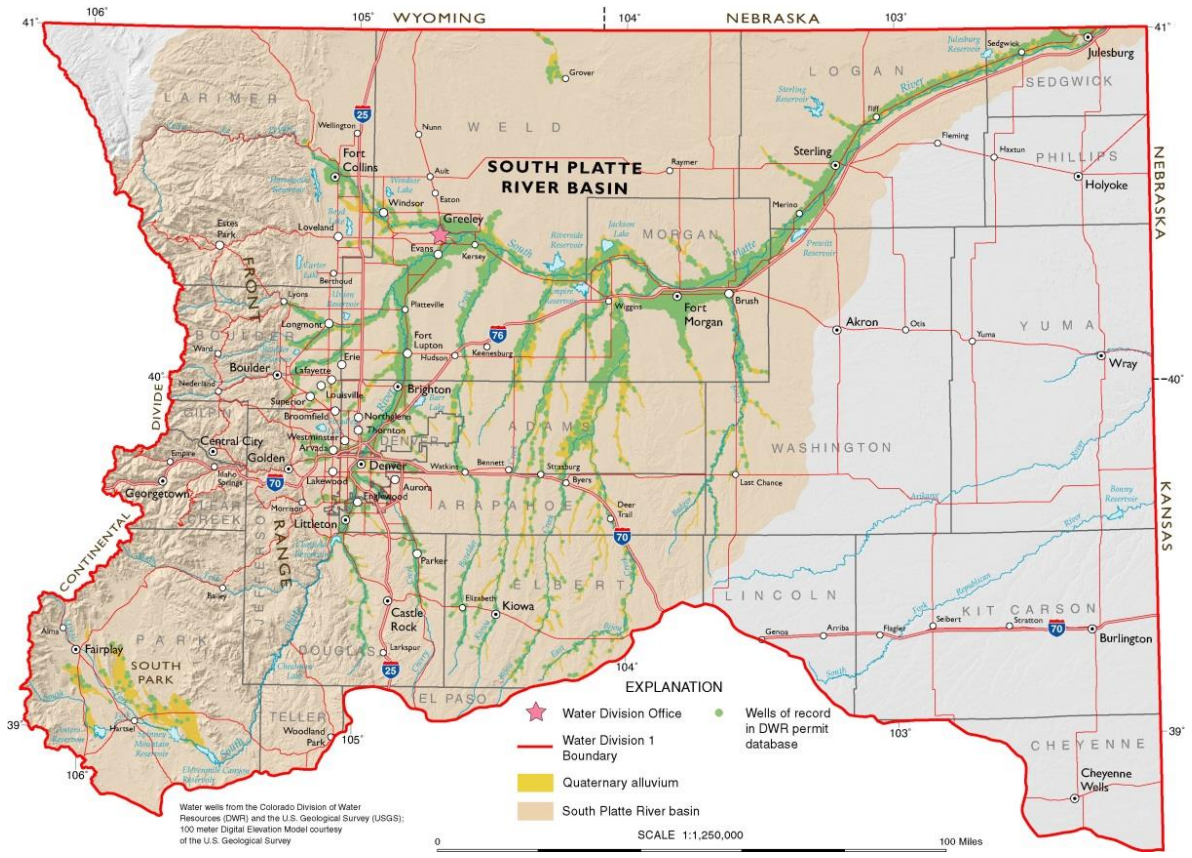
Figure 5. Land managers of the Source Water Protection Area.

WATER QUALITY

Hydrologic Setting

The City of Idaho Springs obtains its drinking water supply from Chicago Creek and its tributary, Devils Canyon. Chicago Creek flows south to north from the Continental Divide on the southern edge to the confluence with Clear Creek, and downstream into the South Platte River in Denver (UCCWPU, 2014). The source water protection area (SWPA) includes the Chicago Creek watershed upstream from the city's intakes; and the Soda Creek watershed upstream from the city's intake that diverts water to the Charlie Tayler Waterwheel. The Chicago Creek watershed SWPA (Hydrologic Unit Code 1019000406) lies within Clear Creek County and drains approximately 48 square miles (27,945 acres). The adjacent Soda Creek watershed (Hydrologic Unit Code 101900040810AA) drains approximately 13.4 square miles (8,605 acres).

The South Platte River Basin is part of Colorado Water Division One with the office of the Division Engineer in Greeley (Fig. 6) (Topper et al, 2003).



SOURCE: GROUND WATER ALTLAS OF COLORADO

Figure 6. Map including the South Platte River Basin.

Stream Segments

West Chicago Creek, Chicago Creek, Devils Canyon, and Soda Creek are perennial streams in the source water protection area that are fed by numerous intermittent tributary channels (Fig. 7). Chicago Creek's headwaters originate in the basin surrounded by the 13,000 foot peaks mentioned earlier, and drain high mountain lakes, alpine tundra, and forested lands within Arapaho National Forest and the Mt. Evans Wilderness. West Chicago Creek, South Chicago Creek, and Chicago Creek flow northerly from their headwaters to merge as the main stem of Chicago Creek approximately 6 miles upstream from Idaho Springs. The upper segment of Chicago Creek flows through the Chicago Lakes and Idaho Springs Reservoir. Devils Canyon is an important perennial tributary that enters Chicago Creek very close to the Water Treatment Plant (WTP), and provides higher quality source water to the City of Idaho Springs.

Soda Creek is located in the lower elevations east of Chicago Creek and is contiguous with Chicago Creek's lower eastern boundary. Tributaries within the Soda Creek watershed include Little Bear Creek, Barbour Fork, and Beaver Brook.

In its 2014 watershed plan update, the Upper Clear Creek Watershed Association provided a comparison of the Event Mean Concentration (EMC) between some local Clear Creek tributaries. The Chicago Creek and Devils Canyon source waters for Idaho Springs were included. Event Mean Concentrations measure the mean concentration of a pollutant parameter during a stormwater runoff event. While nutrients were the focus of the effort, it shows that there is a lower concentration, and therefore better stormwater quality in those watersheds where there is a predominant vegetation cover, and very little land disturbance – as in Devils Canyon. Chicago Creek, while classified as a mountain-forested watershed has more land disturbance in the form of reservoirs, roads, and light residential development. This is reflected in the EMC values, which were generally higher in Chicago Creek, than they were in Devils Canyon (UCCWPU, 2014).

This data corroborates the observations of the city's water treatment staff who prefer to use Devils Canyon water during spring runoff, rather than the more turbid Chicago Creek source. It is also the preferred source when its flows can sustain the City's demand (Sigward, 2016).

Peak flows in the source water protection area occur during the months of May and June when runoff flows from the snowpack are at a maximum. Intense thunderstorms may temporarily increase flow during the summer months. The stream segments in the watershed are generally gaining streams, with flows increasing with distance downstream in proportion to drainage area. Flows in the creeks can be impacted by droughts due to low winter snow accumulation.

Lakes and Reservoirs

There are five lakes/reservoirs located within the Chicago creek portion of the SWPA. These include three instream waterbodies: Upper Chicago Lake, Lower Chicago Lake, and Idaho Springs Reservoir (owned and maintained by the City of Idaho Springs); and Edith and Echo Lakes.

Water Quality Standards

Under the Clean Water Act, every state must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. The State of Colorado's Water Quality Control Commission has established water quality standards that define the goals and limits for all waters within their jurisdictions. Colorado streams are divided into individual stream segments for classification and standards identification purposes (Table 4). Standards are designed to protect the associated classified uses of the streams (Designated Use).

Stream classifications can only be downgraded if it can be demonstrated that the existing use classification is not presently being attained and cannot be attained within a twenty-year time period (Section 31.6(2)(b)). A Use Attainability Analysis must be performed to justify the downgrade.

Table 4. Main Stream Segments within the Source Water Protection Area and Their Designated Use

Segment WBID	Portion of Segment	Designated Use
COSPCL10	Mainstem of Chicago Creek including all tributaries and wetlands, from the source to the confluence with Clear Creek, except for the specific listings in Segment 19	Aquatic Life Cold 1 Water Supply Agriculture Recreation E
COSPCL19	All tributaries to Clear Creek, including wetlands, within the Mt. Evans Wilderness Area	Aquatic Life Cold 1 Water Supply Agriculture Recreation E

SOURCE: WQCC, 2013

Definitions of Designated Uses

The following definitions are paraphrased from WQCC Regulation 31, June 30, 2016:

- Aquatic Life Cold 1: Refers to waters that are capable of sustaining a wide variety of cold-water biota, including sensitive species, or could sustain such biota in correctable water quality conditions. Aquatic Life Cold 2 refers to waters that are not capable of sustaining a wide variety of cold-water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.
- Water Supply: These surface waters are suitable or intended to become suitable for potable water supplies. After receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent), these waters will meet Colorado drinking water regulations and any revisions, amendments, or supplements.
- Agriculture: These surface waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock.
- Recreation Class E - Existing Primary Contact Use. These surface waters are used for primary contact recreation or have been used for such activities since November 28, 1975 (WQCC, 2016).

Impaired Segments

As required by Section 305(b) of the Clean Water Act, the Water Quality Control Division (WQCD) is required to assess and report to Congress on the quality of waters within their State every two years to determine whether beneficial uses are supported. The main stem of Chicago Creek and all its tributaries from the source to Clear Creek are listed as impaired for copper. Therefore, those segments are listed as impaired on the 303(d) list as not supporting the use classification for aquatic life due to numeric standards for copper not being attained. The rationale for listing Chicago Creek and its tributaries is explained as a result of two exceedances within a 3-year period between October 2008 and October 2013. Those exceedances in Table Value Standards occurred on December 12, 2012 and July 8, 2013 (South Platte Regulation #93, 2015). The Soda Creek watershed is not on the States list of impaired waters.

Watershed District Ordinance

Communities throughout Colorado are taking local control by adopting a Watershed Protection Ordinance to protect their drinking water supply from activities that will create a hazard to health and water quality or a danger of pollution to the water supply. Direct authority to create this Watershed District is granted in Section 31-15-707 (1)(b), of the Colorado Revised Statutes, as amended. Municipalities that provide drinking water to their residents have the ability to protect the quality of their drinking water by regulating pollution-generating activities in the watershed from which this water is taken. In particular, this provision gives municipal water providers regulatory and supervisory jurisdiction over all streams and sources contributing to the municipal water supplies for a distance of 5 miles above the points from which municipal water supplies are diverted.

The City of Idaho Springs adopted a Watershed Protection Ordinance in 2006 for the purpose of protecting the sources, supply, quantity, quality, delivery, storage, treatment and distribution of water serving the Town, its citizens and water-using customers (Idaho Springs Municipal Code, Chapter 12, Article 2, Section 12-131). An ordinance was developed to protect the Town's water resources from pollution and degradation within 5 miles upstream of the point of diversion. The City has jurisdiction over any activities *"affecting the purity and/or volume of water available to the City water treatment plant and diversion points…and must obtain a permit for such activity in accordance with the procedures established by the City Council."* (Ord. 8 § 1, 2006)

Upper Clear Creek Watershed Association

In the 1980s, nutrient growth and taste/odor issues in Standley Lake shifted water quality management from individual community concerns to a watershed-wide approach. In 1993, local upper Clear Creek entities and downstream uses developed a plan to coordinate water quality issues relating primarily to nutrients in Clear Creek. These efforts resulted in the adoption of the Clear Creek Watershed Management Agreement. The Agreement, signed by 23 participants, included adoption of a narrative standard for Standley Lake, establishment of the Upper Clear Creek Watershed Association (UCCWA) for upstream entities and development of a cooperative watershed monitoring program. As the designated Section 208-management agency per the Clean Water Act, UCCWA is responsible for overseeing water quality and water

resources issues through the Upper Clear Creek Watershed. The City of Idaho Springs is an active member of the Association. Monthly meetings are held at the Idaho Springs City Hall (UCCWA, 2015).

The Agreement was scheduled to be updated in August 2015 with the goal to continue to maintain the water quality in Clear Creek and Standley Lake to protect both these resources as a water supply for more than a quarter million people and to maintain Clear Creek as an aquatic and recreational resource. The Parties to the updated agreement would continue to cooperate and communicate their respective plans and activities in the following areas:

A. Monitoring water quality in the watershed and Lake;
B. Water-quality policy, planning and management;
C. Water-quality Best Management Practices ("BMPs"); and
D. Funding water-quality and watershed health-related actions.

In comparison to the 1993 agreement, the updated agreement would have a water quality policy, planning and management component that was missing in 1993, which would reference and support local Source Water Protection Plans, Wildfire plans, and other local planning initiatives (Draft Clear Creek and Standley Lake Watershed Agreement, August 14, 2015).

Clear Creek Watershed Foundation

Incorporated in 1997, the Clear Creek Watershed Foundation (CCWF) is a non-profit organization dedicated to improving the ecological, aesthetic, recreational and economic conditions in the Clear Creek Watershed through comprehensive and cooperative efforts with watershed stakeholders. Their focus is on improving the water quality of Clear Creek and its tributaries through watershed-based sustainability projects including: inactive mine remediation; natural resource management; water and wastewater management; preservation and promotion of historic mine sites; alternative energy and transportation; waste stream reduction; subsurface rights and use; and outreach and education. The office of the CCWF is located at 2060 Miner Street, Idaho Spring in the Idaho Springs Visitor Center and Heritage Museum (CCWF, 2015).

Recent Studies

Recent studies, assessments, or plans in the watershed include:

- Clear/Bear Creek Wildfire Watershed Assessment (2013)
- High Peaks to Headwaters Environmental Assessment (2013)
- Upper Clear Creek Watershed Plan Update (2014)
- Clear Creek County Community Wildfire Protection Plan (2008)
- Total Maximum Daily Load Assessment Clear Creek (2008)
- Clear Creek Watershed Report – Exploring Watershed Sustainability (2007) and Annual Report (2013)
- Source Water Protection Plan for Upper Clear Creek Watershed and Standley Lake (2010)
- Upper Clear Creek Watershed Plan, 319 Grant Final Report (2006)
- Upper Clear Creek Watershed Trace-Metals Data Assessment – Clear Creek/Central City Superfund Investigative Area: 2014 Addendum (2014)
- Clear Creek County Hazard Mitigation Plan (Draft May, 2016)
- Public Water System Monitoring Plan, City of Idaho Springs, PWSID# CO-0110020(July 2015)

Drinking Water Supply Operations

Water Supply and Infrastructure

The City of Idaho Springs operates a municipal water supply system that provides drinking water to the residents and commercial users of Idaho Springs. The water treatment utility was originally constructed in 1964 and has been upgraded in 2011. The City's water system consists of surface water supply, storage, treatment, and distribution facilities.

Figure 7. Historic City of Idaho Springs

Raw water is diverted from intakes off Chicago Creek and Devils Canyon into pre-sedimentation basins and flows via gravity into the Idaho Springs Water Treatment Plant. The raw water is treated through a process of membrane filtration and chlorination. After treatment, the filtered water flows via gravity into two aboveground storage tanks, one 470,000 gallon tank and one 750,000 gallon tank. There is a third 18,000 gallon tank, and the clearwell holds 25,000 gallons yielding total water storage capacity at 1,263,000 gallons. The treated water is distributed by gravity to approximately 1,000 residential and commercial service connections or taps (Idaho Springs, 2015).

The City of Idaho Springs provides an Annual Drinking Water Quality Report with the Consumer Confidence Report (CCR) to the public that provides information on the results of their water monitoring program. The 2015 report is available at the Idaho Springs City Hall located at 1711 Miner Street, Idaho Springs, Colorado or online at www.colorado.gov/IdahoSprings. The City is currently in compliance with all State water quality regulations (CCR, 2015).

Figure 8. Chicago Creek originates from high mountain drainages that include the Chicago Lakes.

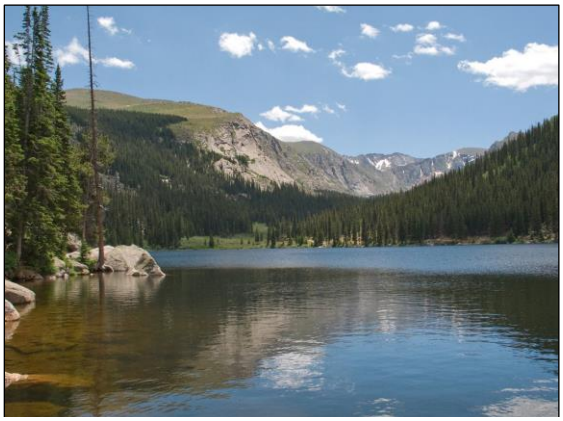


Figure 9. Chicago Creek flows through Idaho Springs Reservoir on its way downstream.

OVERVIEW OF COLORADO'S SWAP PROGRAM

Source water assessment and protection came into existence in 1996 as a result of Congressional reauthorization and amendment of the Safe Drinking Water Act. The 1996 amendments required each state to develop a source water assessment and protection (SWAP) program. The Water Quality Control Division, an agency of the Colorado Department of Public Health and Environment (CDPHE), assumed the responsibility of developing Colorado's SWAP program. Colorado's SWAP program is a two-phased process designed to assist public water systems in preventing potential contamination of their untreated drinking water supplies.

Source Water Assessment Phase

The Assessment Phase for all public water systems consists of four primary elements:

1. Delineating the source water assessment area for each of the drinking water sources;
2. Conducting a contaminant source inventory to identify potential sources of contamination within each of the source water assessment areas;
3. Conducting a susceptibility analysis to determine the potential susceptibility of each public drinking water source to the different sources of contamination;
4. Reporting the results of the source water assessment to the public water systems and the general public.

The Assessment Phase involves understanding where the City of Idaho Springs's source water comes from, what contaminant sources potentially threaten the water sources, and how susceptible each water source is to potential contamination.

Source Water Protection Phase

The Protection Phase is a voluntary, ongoing process in which all public water systems have been encouraged to voluntarily employ preventative measures to protect their water supply from the potential sources of contamination to which it may be most susceptible. The Protection Phase can be used to take action to avoid unnecessary treatment or replacement costs associated with potential contamination of the untreated water supply. Source water protection begins when local decision-makers use the source water assessment results and other pertinent information as a starting point to develop a protection plan. The source water protection phase for all public water systems consists of four primary elements:

1. Involving local stakeholders in the planning process;
2. Developing a comprehensive protection plan for all of their drinking water sources;
3. Implementing the protection plan on a continuous basis to reduce the risk of potential contamination of the drinking water sources; and
4. Monitoring the effectiveness of the protection plan and updating it accordingly as future assessment results indicate.

SOURCE WATER PROTECTION PLAN DEVELOPMENT

Source Water Assessment Report Review

The City of Idaho Springs received their Source Water Assessment Report from the Colorado Department of Public Health and Environment in November 2004. During the Source Water Protection stakeholder meetings, the assessment report was reviewed and used as a starting point to guide the development of this Source Water Protection Plan. A copy of the Source Water Assessment Report for the City of Idaho Springs can be obtained by contacting the Town or by downloading a copy from the CDPHE's SWAP program website located at: http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251596793639.

Defining the Source Water Protection Area

The State's Assessment Report included a delineated Source Water Assessment Area for the City's surface water sources. Delineation is the process used to identify and map the drainage basin or watersheds that supplies water to a surface water source. The delineated source water assessment area provides the basis for understanding where the community's source water and potential contaminant threats originate.

The Steering Committee reviewed the State's delineated Source Water Assessment Area for the City of Idaho Springs's water sources and decided to accept this as the City's Source Water Protection Area. The Source Water Protection Area for the City of Idaho Springs includes the Chicago Creek watershed upstream from the diversion, approximately 48 square miles; and the Soda Creek watershed upstream from its diversion, approximately 13.4 square miles (Fig. 11). This protection area is where the community has chosen to implement its source water protection measures in an attempt to manage the susceptibility of their source water to potential contamination.

Source Water Protection Zones

The Source Water Protection Area includes the following protection zones:

> ***Zone 1*** *is located 1,000 feet on either side of the surface water drainage network and ditch. Zone 1 is the most sensitive and important area to protect from potential sources of contamination. This area is where nonpoint source contaminants are most likely to reach the water source.*
>
> ***Watershed Protection Area*** *includes the 5-mile zone upstream from the City's intakes off Chicago Creek and Devils Canyon. It could also be interpreted as including a 5-mile zone upstream of the Soda Creek intake.*

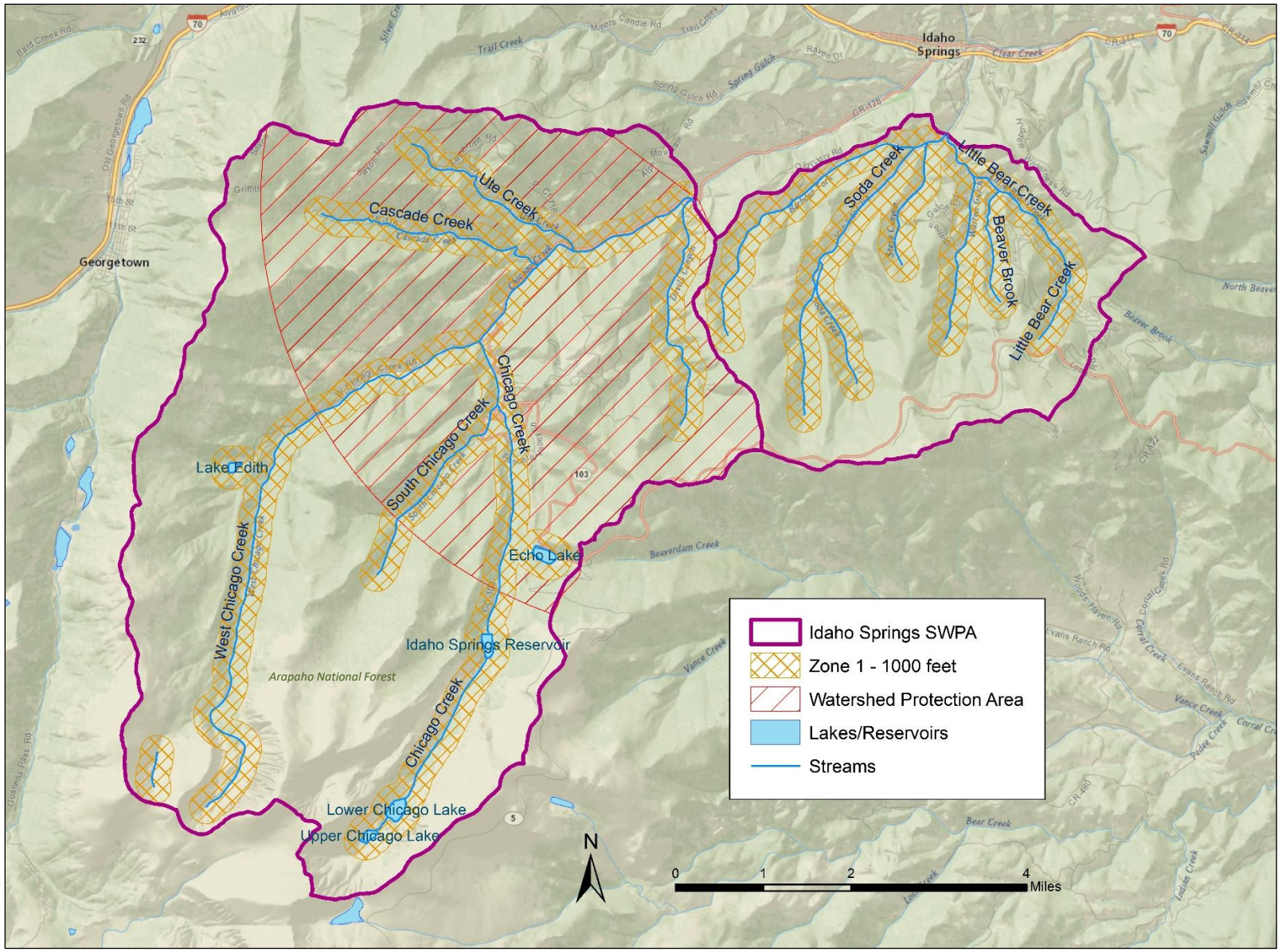


Figure 10. Map of the City of Idaho Springs's Source Water Protection Area.

Potential Contaminant Source Inventory

The State's Source Water Assessment Report identified potential sources of contamination (PSOCs) that might be present within the source water assessment areas. In 2016, CDPHE provided the City of Idaho Springs with Geographic Information System (GIS) information on these potential contaminant sources located within the assessment areas. The Steering Committee conducted a more accurate and current contaminant source inventory of the Source Water Protection Area. This report will only reflect the current inventory.

Discrete contaminant sources (point sources) were inventoried using selected state and federal regulatory databases including: mining and reclamation, oil and gas operations, above and underground petroleum tanks, Superfund sites, hazardous waste generators, solid waste disposal, industrial and domestic wastewater dischargers, solid waste sites, and water well permits.

Dispersed contaminant sources (nonpoint sources) were inventoried using recent land use, land cover and transportation maps of Colorado, along with selected state regulatory databases. A table of Contaminants Associated with Common PSOCs is included in the Appendices of this report.

The Steering Committee identified other areas of concern to add to the potential contaminant source inventory, combining these into a list of issues of concern within the source water protection area that may impact the City of Idaho Springs's drinking water sources.

Issues of Concern

- Abandoned mine lands
- Roads: runoff, maintenance, spills
- Flooding
- Wildland fires
- Dumping
- Dam failure
- Future mining activity
- Weed abatement
- Storage tanks
- Recreation
- Trout pond
- Reservoir maintenance
- Septic systems and development
- Permitted dischargers

Priority Strategy

The Steering Committee used the SWAP Risk Assessment Matrix developed by CRWA to prioritize the issues of concern (Table 5). Using SWAP Risk Assessment Matrix, the Steering Committee considered the following criteria when estimating the risk of each issue of concern.

1. **Impact to the Public Water System** – The risk to the source waters increases as the impact to the water system increases. The impact is determined by evaluating the human health concerns and potential volume of the contaminant source. CDPHE developed information tables to assist with this evaluation (See Appendices). The following descriptions provide a framework to estimate the impact to the public water system.
    - **Catastrophic** - irreversible damage to the water source(s). This could include the need for new treatment technologies and/or the replacement of existing water source(s).
    - **Major** - substantial damage to the water source(s). This could include a loss of use for an extended period of time and/or the need for new treatment technologies.
    - **Significant** - moderate damage to the water source(s). This could include a loss of use for an extended period of time and/or the need for increased monitoring and/or maintenance activities.
    - **Minor** - minor damage resulting in minimal, recoverable, or localized efforts. This could include temporarily shutting off an intake or well and/or the issuance of a boil order.
    - **Insignificant** - damage that may be too small or unimportant to be worth consideration, but may need to be observed for worsening conditions. This could include the development of administrative procedures to maintain awareness of changing conditions.

2. **Probability of Impact** – The risk to the source waters increases as the relative probability of damage or loss increases. The probability of impact is determined by evaluating the number of contaminant sources, the migration potential or proximity to the water source, and the historical data. The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within one to ten years.
    - **Certain**: >95% probability of impact
    - **Likely**: >70% to <95% probability of impact
    - **Possible**: >30% to <70% probability of impact
    - **Unlikely**: >5% to <30% probability of impact
    - **Rare**: <5% probability of impact

The steering committee determined where each issue of concern is located within the source water protection area (i.e., Zone 1 or 2). This determination of location in conjunction with the estimation of risk to the source water, helped guide the prioritization of the issues of concern in a way that best fits the needs and resources of the community.

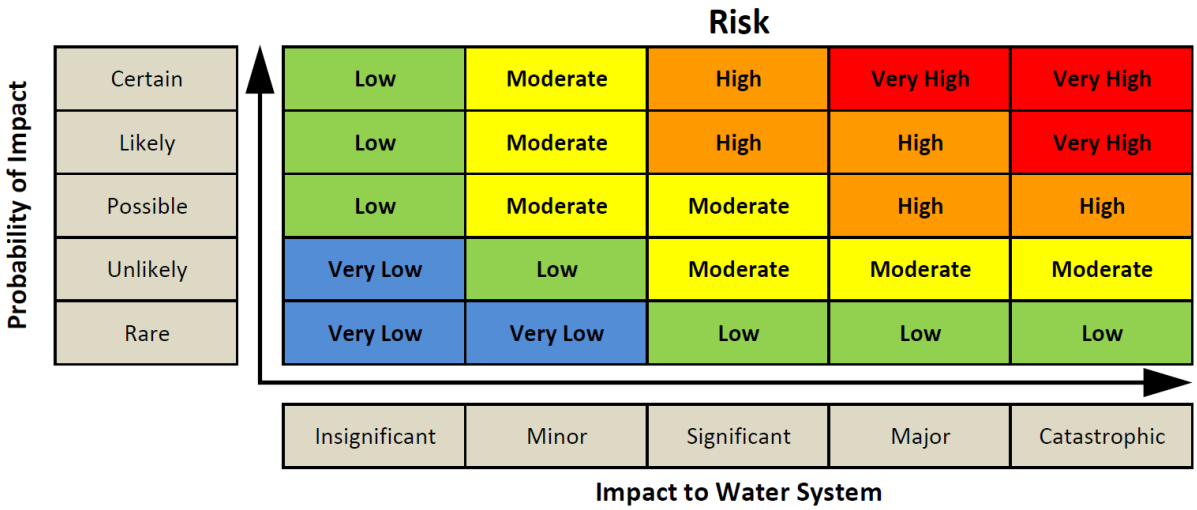


Figure 11. CRWA's SWAP Risk Assessment Matrix

The Steering Committee ranked the potential contaminant source inventory and issues of concern in the following way (Table 5):

Table 5. Potential Contaminant Source Prioritization using SWAP Risk Assessment Matrix

Potential Source of Contamination or Issue of Concern	Proximity (SWPP Zone)	Impact to Water System (Insignificant, Minor, Significant, Major, Catastrophic)	Probability of Impact (Rare, Unlikely, Possible, Likely, Certain)	Risk (Very Low, Low, Moderate, High, Very High)
Wildfire	1, 2	Major	Certain	Very High
Runoff and spills on roads	1	Significant	Certain	High
Abandoned Mine Land	1,2	Significant	Possible	Moderate
Future Mining Activity	1,2	Significant	Possible	Moderate
Flooding	1	Significant	Possible	Moderate
Dumping	1	Significant	Possible	Moderate
Permitted Discharger	1	Significant	Possible	Moderate
Dam Failure	1	Significant	Unlikely	Moderate
Septic Systems	1	Minor	Possible	Moderate
Development	1	Minor	Possible	Moderate
Reservoir Maintenance	1	Minor	Unlikely	Low
Weed Abatement	1	Minor	Rare	Very Low
Storage Tanks	1	Insignificant	Rare	Very Low
Recreation	1	Insignificant	Rare	Very Low
Trout Pond	1	Insignificant	Rare	Very Low

DISCUSSION OF ISSUES OF CONCERN

The following section provides a description of the issues of concern that have been identified in this plan, describes the way in which they threaten the water sources and outlines best management practices. The purpose of this section is as a guidance document to understand the issues. The prioritized list of issues of concern includes:

Very High Risk: Wildfire

High Risk: Runoff and Spills on Roads

Moderate Risk: Abandoned mine land, future mining activity, flooding, dumping, permitted dischargers, dam failure, septic systems, development

Low Risk: Reservoir maintenance

Very Low Risk: Weed abatement, storage tanks, recreation, trout pond

Surface and Groundwater Contaminants

Many types of land uses have the potential to contaminate source waters: spills from tanks, trucks, and railcars; leaks from buried containers; failed septic systems, buried or injection of wastes underground, use of fertilizers, pesticides, and herbicides, road salting, as well as urban and agricultural runoff (Fig. 12). While catastrophic contaminant spills or releases can wipe out a water resource, groundwater degradation can result from a variety of small releases of harmful substances. According to the U.S. EPA, nonpoint-source pollution (when water runoff moves over or into the ground picking up pollutants and carrying them into surface and groundwater) is the leading cause of water quality degradation (GWPC, 2008).

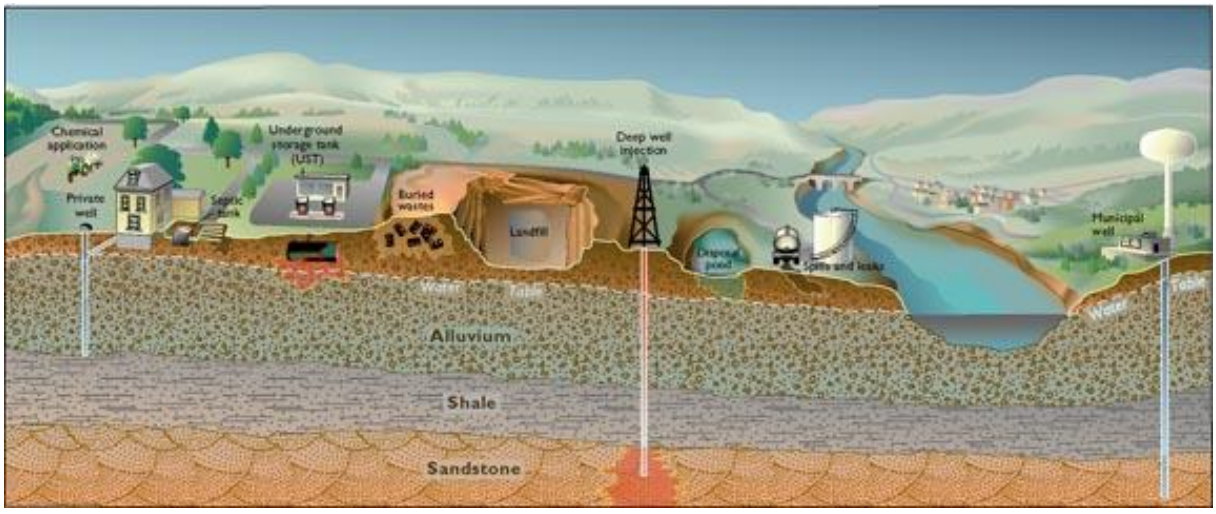


Figure 12. Schematic drawing of the potential source of contamination to surface and groundwater.

Mining

The rich mining history of the Idaho Springs area began in 1859 with the discovery of placer gold near the mouth of Chicago Creek, the watershed of primary interest for this Source Water Protection Plan. Soon after this initial discovery, credited to George Jackson, prospecting for gold veins spread up Chicago Creek and into its tributaries and gulches. Probably the first veins discovered were the Quito and the Little Mattie. Exploration was carried on in these and many other mines. Only high grade ore was shipped at first, and extensive underground development of the veins did not begin until about 1880. By 1884 the Little Mattie, Silver King, Charter Oak, Muscovite, Kitty Clyde, Humboldt, Eclipse, and Silver Glance mines were all being worked. Vigorous work was carried out in these and other mines until the Silver Panic of 1894, when many were shut down, or drastically reduced production. (Harrison & Wells, 1959)

Abandoned Mine Lands

Mining practices during the early days allowed the mine owners to simply abandon their mines without consideration of the impact on streams, water quality, slope stability and safety. Many old mining properties contain abandoned mine workings, mine waste and/or mill tailings. Multiple historic mine sites including several adits, tunnels, ore processing mills, and waste rock piles are located within close proximity to Chicago Creek and its tributaries (Fig. 13). Information on mineral resources in the SWPA was obtained from the U. S. Geological Survey. The Division of Reclamation, Mining and Safety (DRMS) has conducted extensive mine land reclamation activities within the SWPA over the past several years as indicated in the map below.

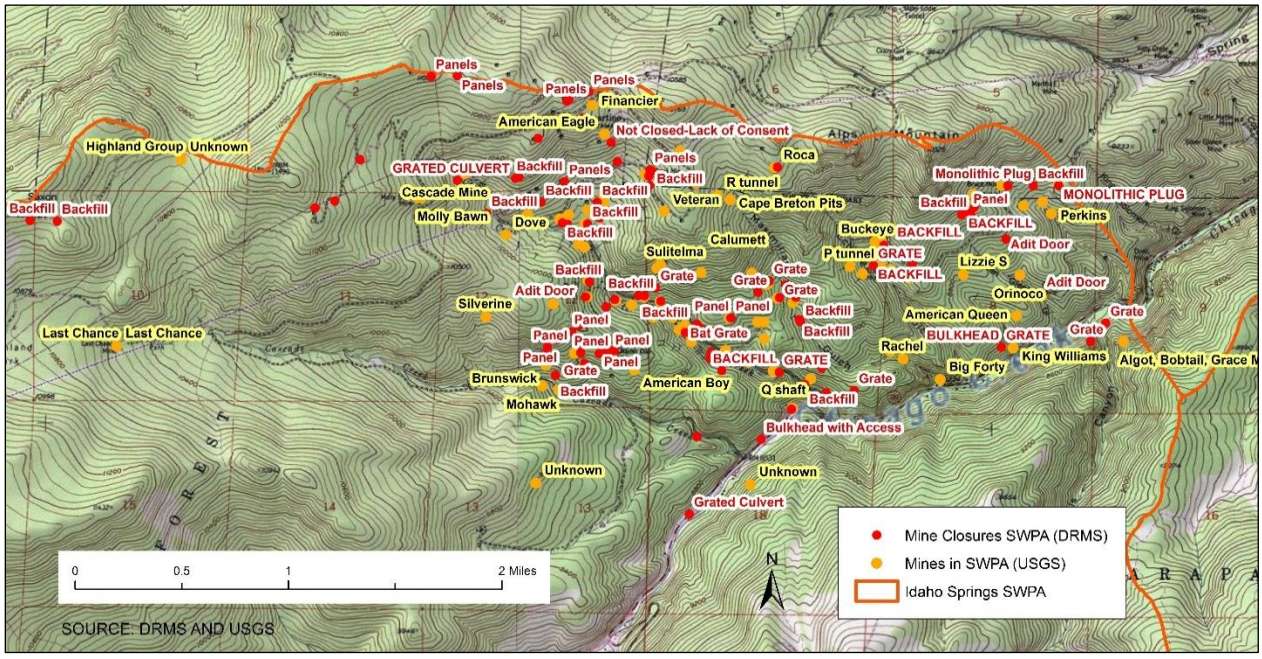


Figure 13. Map of abandoned mine sites and mine land reclamation in the Chicago Creek Watershed SWPA.

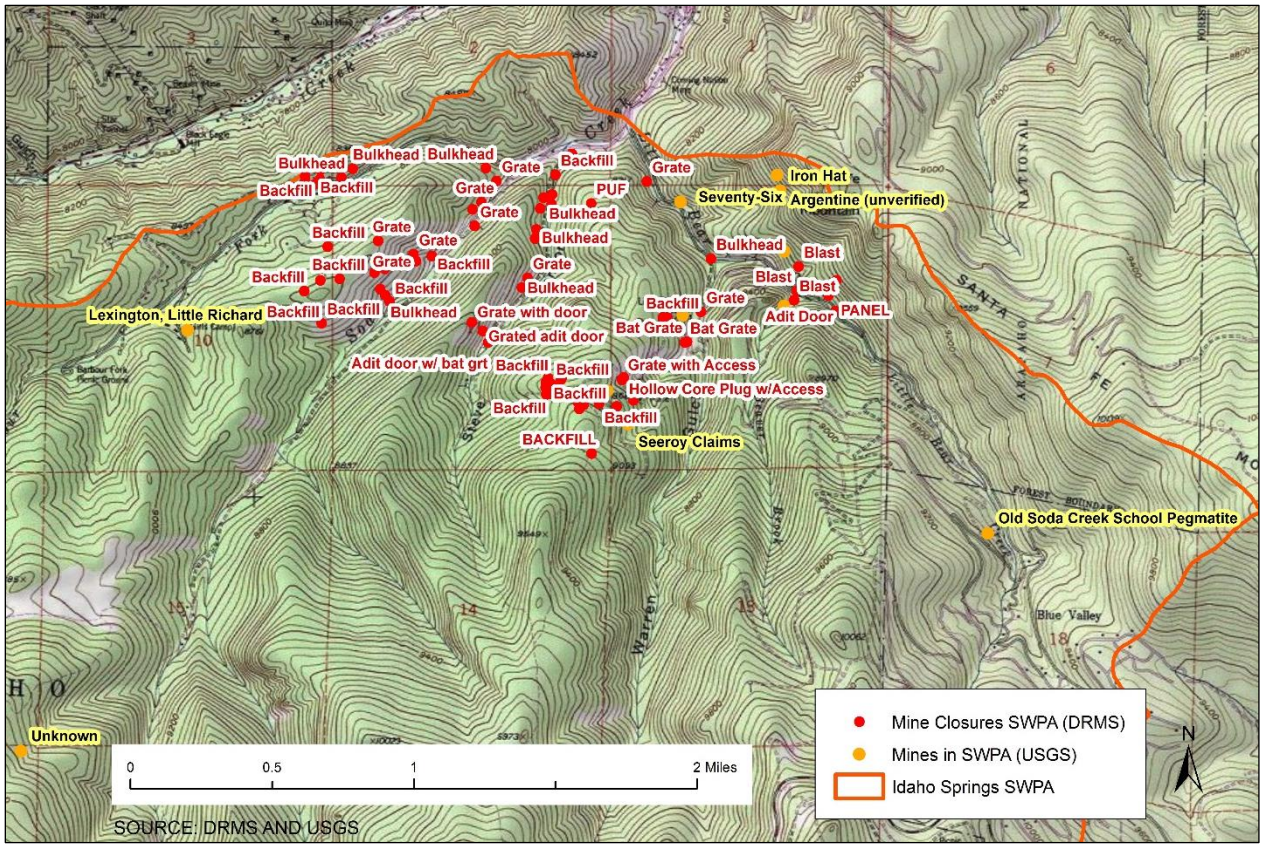


Figure 14. Map of abandoned mine sites and mine land reclamation in the Soda Creek Watershed SWPA.

In 2015 the Colorado Division of Reclamation & Mining completed a map entitled “Colorado Mining Stream Impacts and Restoration Efforts” that shows an inventory of the higher risk mine sites in Colorado, and their status with regard to draining water and remediation. There is only one shown in the SWPA, the Black Eagle Mill Site, which has been reclaimed, although without any active water quality treatment.

The GIS data set accompanying the report specifically indicates the location of mine sites that have water draining from them, and that therefore have a higher risk of compromising local water quality. None of the Clear Creek county sites are located in the Idaho Springs Source Water Protection Area. The Lamartine Mine as indicated on the USGS topographic map layer is just inside the northern boundary of the SWPA delineation for Chicago Creek, and well outside of the 1000-foot delineation for Ute Creek. However, the historic workings of the Lamartine extend over the ridge into the adjacent watershed where DRMS has completed some closure projects.

Permitted Mines

Thousands of unpatented claims and small exploratory mining operations throughout Colorado exist, most of which were never recorded in state or local government offices. It was not until 1973 that the State of Colorado required mines to be permitted. Current mining permit data were obtained from the Colorado Division of Reclamation, Mining, and Safety. Within the protection area, there were five mining operations that applied for permits and no current active mining operations (Table 6).

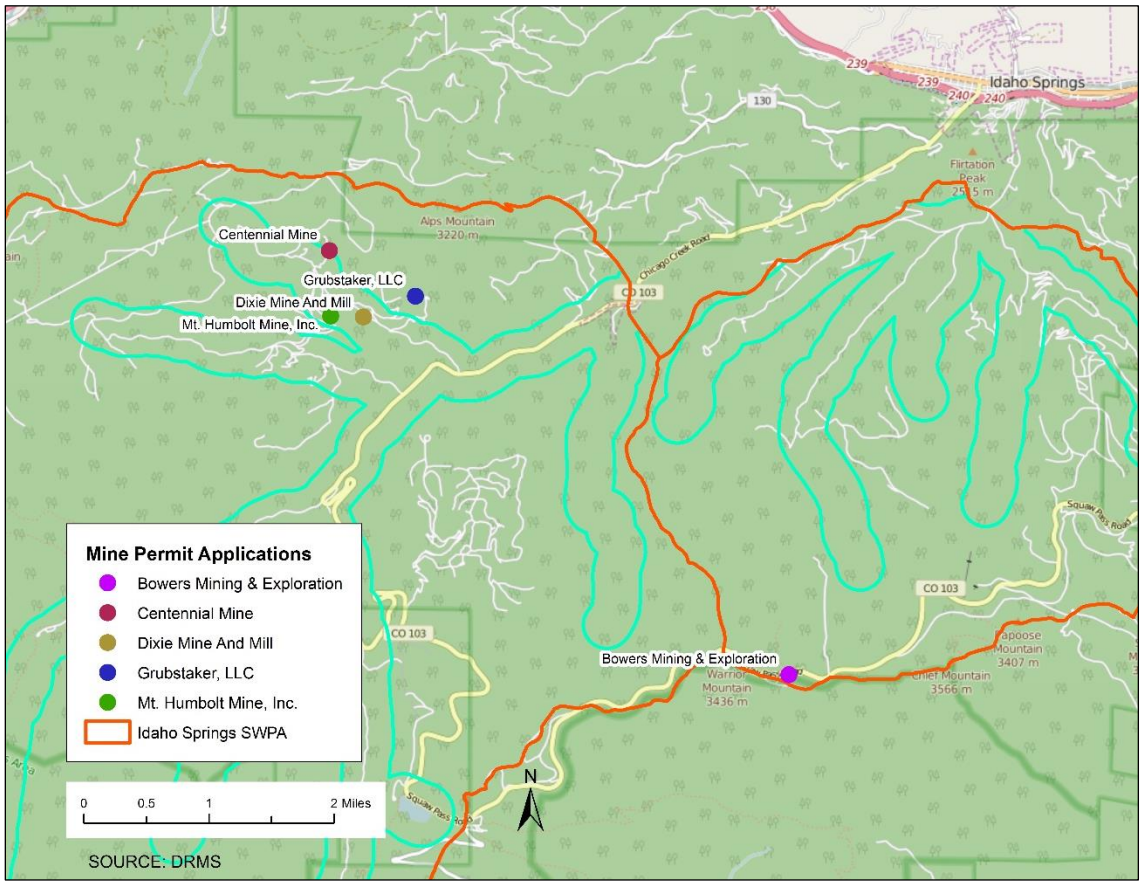


Figure 15. Mine permits.

Table 6. Permitted Mines within the Source Water Protection Area

Mines -Operator	ID Number	Commodities Mined	Permit Status
Centennial Mine - Horizon Gold Shares, Inc.	M1984179	Silver/gold	Terminated
Grubstaker LLC	M2012049	Unknown	No permit
Mt Humbolt Mine Inc. - Nationwide Minerals & Energy		Gold	Denied
Dixie Mine and Mill - Anicol Corporation)		Silver	Revoked
Bowers Mining & Exploration	M1976006HR	Uranium	No permit issued No land disturbed No commodity mined

Future Mining Activity

There are unpatented mining claims filed on public and private land within the watersheds. As of August 2016, there are 15 unpatented mining claims filed with the Bureau of Land Management (BLM) within the Idaho Springs SWPA (Fig. 16). Both the U.S. Forest Service and the BLM have authority on both federal surface and federal mineral interests (subsurface) with the BLM being the permitting agency. The unpatented claims on private and public lands are handled by the BLM.

There have been incidents in Colorado of unpatented mining claims being sold to unprofessional, or "hobby" prospectors/miners whose actions have had unintended consequences on watersheds through accidental discharges of metal-laden waters. One such incident occurred on the Little Bear Creek tributary to Soda Creek (Holm, 2016).

Mineral rights on land within the SWPA that are owned by the federal government are identified in Figure 16 below. Mineral rights are the right of ownership of the mineral resources under/in a tract of land (generally subsurface). The BLM maintains Surface and Mineral Land Status maps showing ownership status (i.e., federal, state or private ownership). The potential for future mineral development in Clear Creek County depends on the future economic and resource needs on both public and private lands. Commercial mining activities are well-reviewed, regulated, permitted, and bonded.

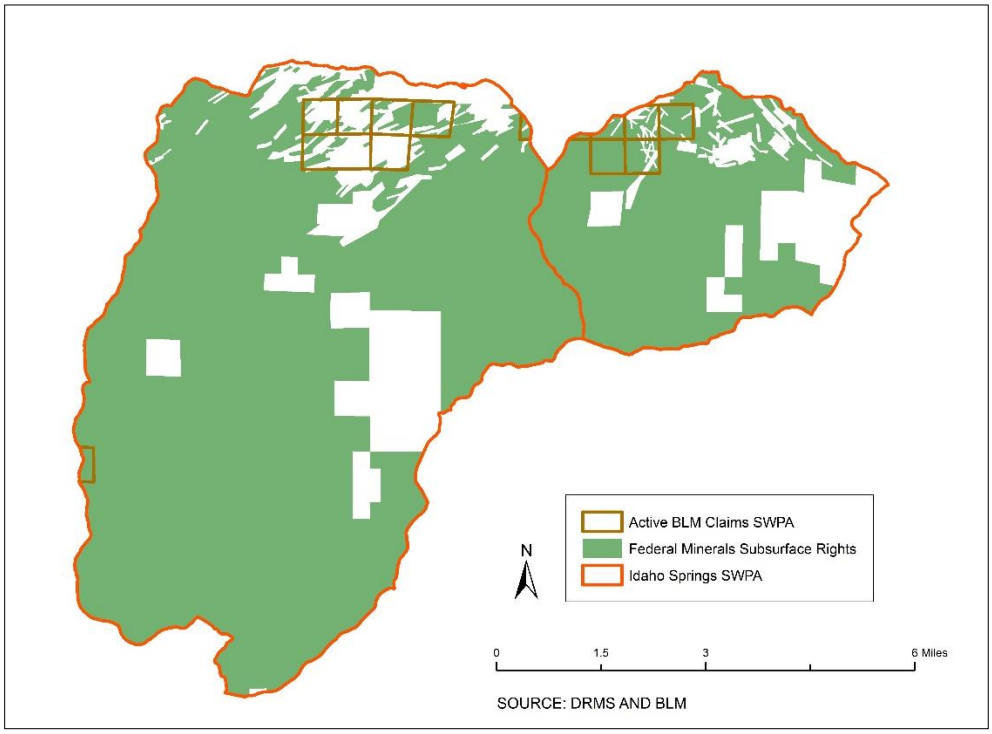


Figure 16. Map of active unpatented BLM mining claims and federal mineral rights.

Water Quality Concerns

The historic mining activity has resulted in a potential for heavy metal and other mining-related contamination to occur throughout the SWPA. Active and inactive mining operations have a potential to contaminate drinking water supplies from either point source discharges (i.e., mine drainage tunnels of flowing adits) or nonpoint source discharges from run-off over waste rock or tailing piles. Extreme rainfall and snowmelt events have also triggered catastrophic releases when hydraulic pressure breaches underground collapse features, suddenly causing mine wastewater to surge out into local tributaries. That can be an issue at abandoned mine sites that had not previously been identified as having draining water.

Water Quality data for the Chicago Creek and Soda Creek watersheds are limited. In the Total Maximum Daily Load (TMDL) Assessment for Clear Creek, published by the Colorado Department of Public Health & Environment (CDPHE) there is no mention of metal contribution from either tributary (WQCD, 2008). However, the Clear Creek Watershed Plan (CCWP) Update of February 2014 shows Ute Creek (a tributary to Chicago Creek above the WTP intake) as being mining impacted; and ranks the metal/aggregate mining impacts to Chicago Creek as "Moderate". The CCWP identifies Soda Creek as "Moderate - High" for impacting the water quality of the larger Clear Creek watershed from sources other than metals. Stakeholder comments from that planning process recommended controlling impacts from historic mining, implementing mitigation BMPs in Soda Creek and that new studies or assessments are conducted in both watersheds (UCCWPU, 2014). CDPHE is currently planning to do additional characterization of the Chicago Creek watershed in 2017 (Alms, 2016).

As noted earlier, Chicago Creek is on the 303(d) list as not meeting aquatic life standards for copper. Some of the data supporting that listing came from water quality sampling sponsored by UCCWA, specifically sampling point "CC-35" that is located on Chicago Creek very close to the Idaho Springs WTP intake (UCCWPU, 2014, Figure 2-1). No further water quality sampling was done at point CC-35 after 2009 (CCWF, 2016). Two additional monitoring points that contributed to the data were at South Chicago Creek and Highway 103 and on Chicago Creek just below the confluence with West Chicago Creek.

Mining Recommendations:

1. Stay informed and participate in the efforts to mitigate impacts from mining within the SWPA.
2. Continue to evaluate water quality monitoring data to characterize the effects of mined land reclamation activities and impacts of abandoned mine lands.
3. Develop a baseline of water quality data for Chicago and Soda Creeks. Consider participating in the River Watch program (or other) to monitor the water quality of Chicago and Soda Creeks.
4. Get involved in the review process for new mining activity permits at the State and County level including unpatented claims on both public and private lands.

Transportation on Roads

The source water protection area, located outside the boundaries of the City, is accessed by two-lane paved and native surface roads. County Road 103 (aka Chicago Creek Road) connects Idaho Springs to the Mt. Evans road, and beyond that via Squaw Pass to Bergen Park and Evergreen. The Clear Creek County road section is maintained year around by the Clear Creek County Road and Bridge Department.

Native surface roads within the source water protection area include West Chicago Creek Road, also called Forest Road 114, and numerous Forest Service routes within the Ute Creek basin and the headwaters of Devils Canyon. The native surface roads are maintained seasonally by the Clear Creek County Road Department and the U.S. Forest Service as needed. Annual road maintenance on the County roads consists of grading the road surface.

The roads in the protection area are used for residential, utility, tourism and recreational access. Thousands of visitors travel over the Squaw Pass road every year, with the majority of use occurring in summer and fall. Forest routes within the Chicago Creek basin are popular with ATV/OHV enthusiasts.

Contaminants of Concern

The construction and maintenance of roads has been recognized as a potential source of contaminants in forested watersheds. Roads can change natural run-off patterns by increasing the amount of impervious surface in a watershed, intercepting overland flow, and routing this water directly into streams. Storm water runoff over these roads can deliver contaminants from the road surface into nearby surface waters including vehicular leaks, spills and sediment.

Runoff from the Chicago Creek road enters Chicago Creek through surface channels connected to culverts and roadside ditches. Road runoff is generated during snowmelt and during summer rainstorms. The water-quality effects of road runoff are more substantial during low streamflows of early snowmelt and late summer baseflows due to the low dilution capacity (Stevens, 2001).

Similarly, native surface roads along creek corridors, like that along South Chicago Creek/Hefferman Gulch and West Chicago Creek, can also have the potential for delivering sediment to the creek. Increased sediment delivery also has the potential for impacting the physical instream habitat by causing reductions in the quality and quantity of aquatic habitats and overall ecological health of the stream system. The Clear Creek Watershed Plan of 2014 noted that the upper West Chicago Creek road was singled out for USFS implementation of the “High Peaks to Headwaters Fisheries & Watershed Restoration EA” to address aquatic life and sediment loading concerns.

The Clear Creek Ranger District has implemented closures of Forest roads 247.1D and 769.1, which were identified as having negative impacts on the water quality and aquatic habitat of

the adjacent creek. The objectives of decommissioning is to reduce soil erosion, decrease road density, reduce impacts to fish and aquatic habitat associated with sedimentation and stream crossings, and restore natural infiltration rates (USFS, 2013).

Motor vehicles leaks are a major source of water pollution to both surface and ground water. Vehicular leaks on the roadway may runoff during storm events and deliver contaminants from the road surface into nearby creeks. Runoff from roads may have a high concentration of toxic metals, suspended solids, and hydrocarbons, which originate largely from automobiles (Gowler and Sage, 2006).

Vehicular spills may occur along the transportation route within the source water protection area from trucks that transport fuels, septic waste and other chemicals that have a potential for contaminating the source waters. Accidental spills of small amounts of contaminants may not be detected or reported and are often diluted with rainwater or snowmelt, potentially washing the chemicals into the soil or nearby waterways. Large spills require immediate emergency response from the local fire department to ensure contaminants do not enter the source waters. Spills may also occur in parking areas along the Highway 103 corridor that provide access to trailheads including Echo Lake.

A release of any chemical, oil, petroleum product, sewage, etc., which may enter waters of the state of Colorado (which include surface water, ground water and dry gullies and storm sewers leading to surface water) must be reported immediately to CDPHE. Spills and incidents that have or may result in a spill along a highway must be reported to the nearest law enforcement agency immediately. The Colorado State Patrol and CDPHE must also be notified as soon as possible (CDPHE, 2009). More information on “Environmental Spill Reporting” can be found in the Appendices of this report.

During winter, Clear Creek County Road and Bridge Department plows and applies a salt and sand mixture as a deicer to their Squaw Pass road section. A recent study conducted by the U.S. Geological Survey demonstrates a detrimental impact from road-salt runoff to surface water affecting the stream water quality and aquatic life (Corsi, et al, 2010). Salt contributes to increased chloride levels in groundwater through infiltration of runoff from roadways. Unlike other contaminants, such as heavy metals or hydrocarbons, chloride is not naturally removed from water as it travels through soil and sediments and moves towards the water table. Once in the groundwater, it may remain for a long time if groundwater velocity is slow and it is not flushed away. Chloride may also be discharged from groundwater into surface water and can account for elevated levels of chloride throughout the year, not just in winter. In high concentrations for extended periods, chloride in streams is toxic to aquatic life. Chloride may also negatively impact vegetation near the roadside; an important part of the riparian corridor (Wood, et al, 2005).

Roadways are also frequently used for illegal dumping of hazardous or other types of waste. Illegal dumping along County roads has been identified as a potential risk.

Figure 17. Placing signage along the road corridor within the source water protection area is one way of educating travelers on how to notify emergency personnel if a contamination should occur.

Transportation Corridor Recommendations:

1. Educate the public on how to respond to hazardous spills and dumping by calling "911". This can be done with signage on the roads entering the protection area along with information in a public brochure distributed to residents and visitors in the protection area. Obtain approval from County Planning Department prior to constructing "Drinking Water Protection Area" signage on roadways.

2. Work with local emergency response teams to ensure that any spill within the protection area can be effectively contained and proper protocols are followed for clean-up of hazardous materials spilled within the transportation corridors. Refer to the County Emergency Management Plan.

3. Keep informed on road maintenance practices and schedules within the SWPA.

4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Clear Creek County Road and Bridge Department, U.S. Forest Service Clear Creek Ranger District, Clear Creek Fire Authority, and Clear Creek County Office of Emergency Management (OEM).

5. Request to be notified by Clear Creek County (OEM) when a hazardous spill occurs within the SWPA.

6. Consider the purchase small spill kits to be used by utility, managers, and responders within the SWPA.

Public Land Management

Public lands within the Source Water Protection Area, owned by the federal government, are managed by the U.S. Department of Agriculture's Forest Service. The source waters for the City of Idaho Springs originate on Arapaho National Forest land managed by the Clear Creek Ranger District located at 101 Highway 103, Idaho Springs, Colorado. These source waters have a potential to be directly affected by land use or forest management activities and decisions.

Protecting Water Resources

A principal purpose for which the Forest Reserves (predecessor to the National Forest System) were established was to "secure favorable conditions of water flows" (Organic Act of 1897). Throughout its history, the Forest Service has had a very diverse and broad mission of multiple use management outlined by the Federal Land Policy and Management Act. This means that they balance outdoor recreation and preservation of wildlife habitat, air and water, and other scenic and historical values with environmentally responsible commercial development of the land and its resources. The Forest Service's mandate to manage lands for multiple-use requires balancing present and future resource use with domestic water supply needs as well as many other needs.

One of the long-term management goals of the Rocky Mountain Region is to manage the forest for water resources:

> *"Protect the resource. Maintain, and where opportunities exist, restore watershed and forest health to ensure full watershed function exhibiting high geomorphic, hydrologic, and biotic integrity. Ensure that forest management activities occur in a manner that will adequately protects the integrity of watersheds" (USFS, 2010).*

In October 2009, the Forest Service Rocky Mountain Region and the State of Colorado Department of Public Health and Environment (CDPHE) signed a Memorandum of Understanding (MOU) to establish a framework to work together on issues regarding the management and protection of water quality on state defined Source Water Assessment Areas on National Forest System lands in Colorado. Under this agreement, the Forest Service recognizes a CDPHE-delineated Source Water Area as a "Municipal Supply Watershed" per definition in Forest Service Manual 2542 (FSM, 2007). The MOU was updated in 2014 (MOU, 2014). Over three-fourths of the source water protection area for the City of Idaho Springs lie within these National Forest lands and according to the MOU will be included in future Revised Forest Plans as a municipal supply watershed.

Forest Plan

At the District level, the Clear Creek Ranger District adheres to the management directives established under the 1997 Revision of the Land and Resource Management Plan (1997 Forest Plan) for the Arapaho and Roosevelt National Forest and Pawnee National Grasslands (ARNF/PNG). The revised 1997 Forest Plan identifies management area prescriptions with directions for activities and management practices to be followed within the specified area (Fig. 18) (USDA, 1997).

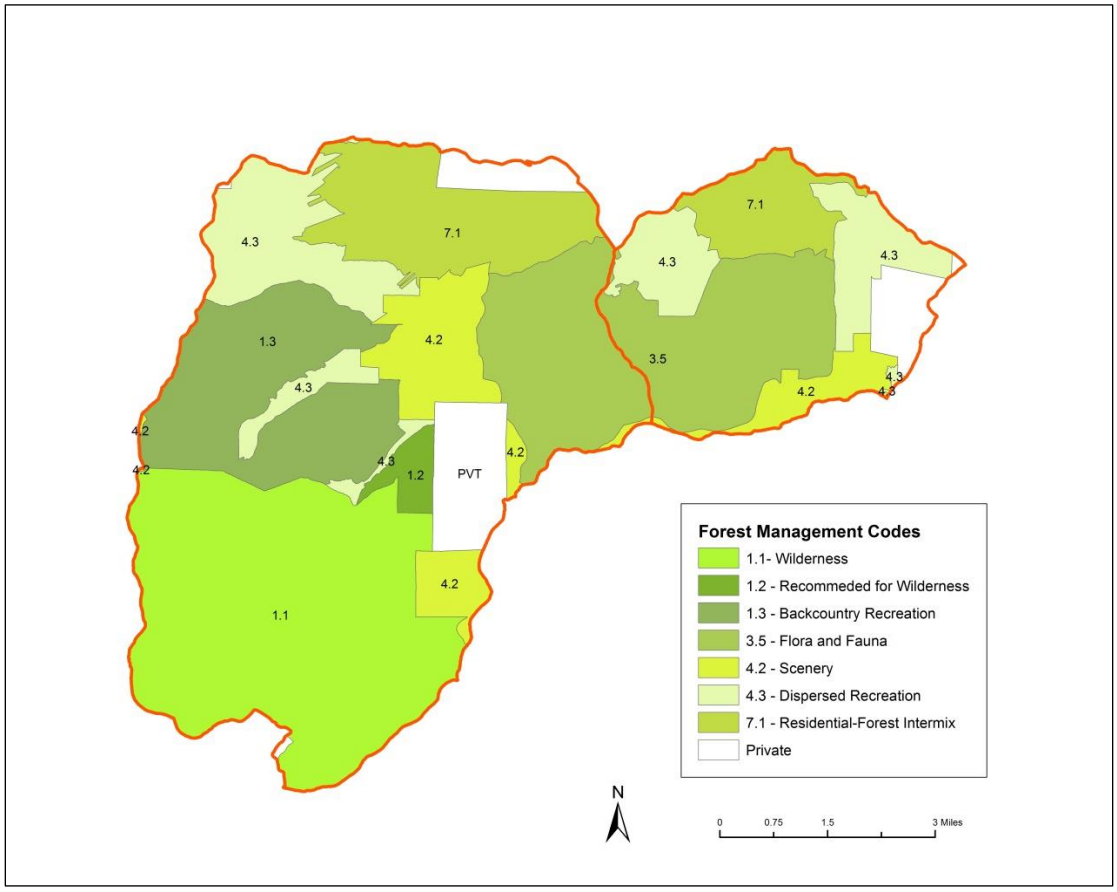


Figure 18. Map of the Forest Plan's management area prescriptions (codes) within the SWPA.

Water Quality Concerns

The Steering Committee identified activities on public land within the source water protection area that have a potential for impacting the water quality of Chicago and Soda Creeks. These include dispersed camping along the riparian corridor with lack of sanitation facilites for campers; wildland fires; forest health; and mining and vehicular travel (previously addressed in this report).

Camping

The Forest Service maintains two designated campgrounds along the Chicago Creek corridor, Echo Lake Campground with 18 campsites and West Chicago Creek Campground with 16 sites. These designated campgrounds are open from June to mid-September. Dispersed camping has occurred along the South Chicago Creek roadway within the riparian corridor and along the West Chicago Creek riparian area. The dispersed camping sites along those creeks were identified as having a potential to adversely affect water quality of the creek due to the lack of sanitation facilities for the campers. The ARNF/PNG Forest Plan (USDA Forest Service 1997) provides direction on dispersed camping sites to close, rehabilitate, or otherwise mitigate sites when unacceptable resource damage is occurring (USFS, 2013). The Clear Creek Ranger District has implemented the closures of dispersed camping along both roadways (Wu, 2016).

Forest Health Conditions

The overly dense forests throughout the Rocky Mountains are concentrated with older age classes of trees that lack diversity in age and size. This lack of diversity, along with intense competition for resources has left many forest stands vulnerable to insect and disease attacks and widespread damage.

The U.S. Forest Service Rocky Mountain Region 2 conducts aerial and ground surveys annually over western conifer and aspen forest to detect damage caused by defoliating insects. The aerial detection survey conducted from 2012 to 2015 provides us with current information on insect damage in the SWPA and surrounding areas as indicated in Fig. 16 (USFS, 2014).

Although Mountain Pine Beetle is considered an epidemic throughout the west, the spread of the mountain pine beetle epidemic has slowed dramatically. Tree mortality is a continuing problem in high-elevation subalpine fir (*Abies lasiocarpa*). The 2012 – 2015 surveys showed small pockets of Subalpine Fir Mortality in the SWPA and surrounding area. The Subalpine Fir Mortality in these areas is from both insects and disease. Mortality is attributed to a combination of the western balsam bark beetle (*Dryocoetes confuses*) and two species of root decay fungi (*Armillaria* sp. and *Heterobasidion annosum*) (Harris et al, 2011). The 2015 aerial survey specifically identified the location of the western balsam beetle.

Figure 19 shows the progression of fir mortality in the upper Ute and Cascade creek drainages in the Chicago Creek watershed. One of the goals of the Clear Creek Ranger District is to implement fuel reduction BMP's in that area to open up the Aspen stands, and reduce fuel loading (Wu, 2016).

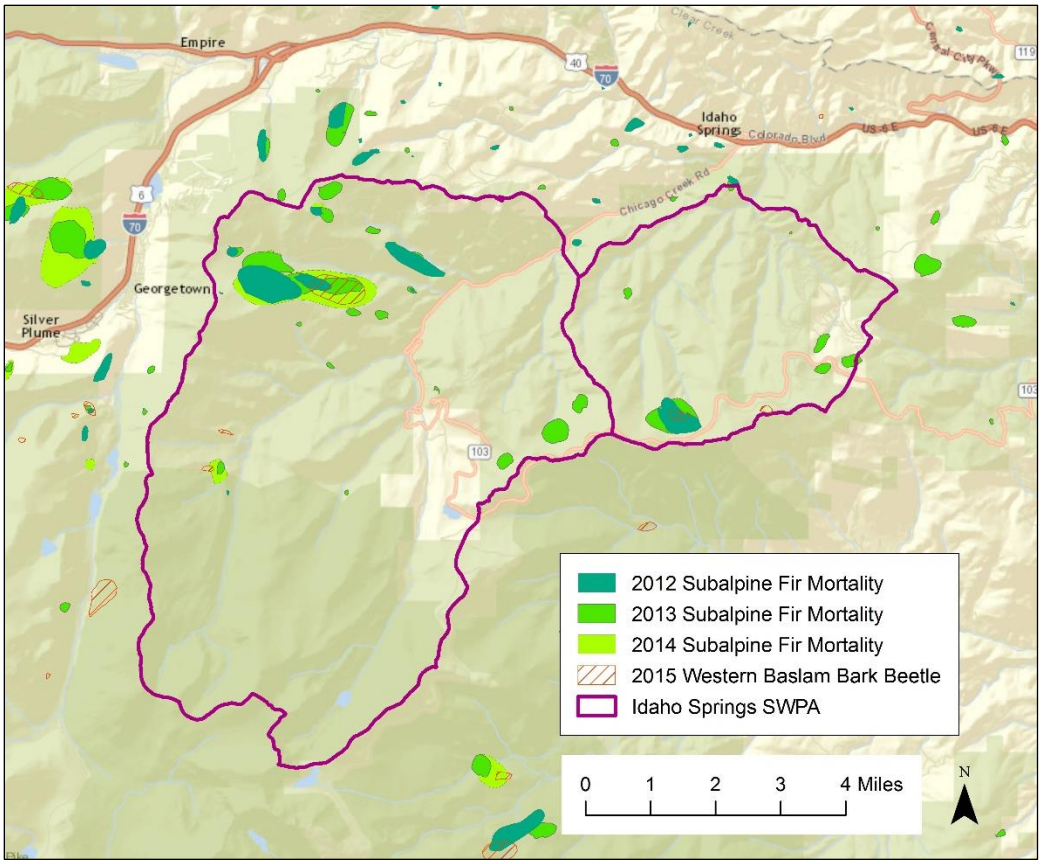


Figure 19. Map of the Subalpine Fir Mortality in and surrounding the Source Water Protection Area from the 2012 to 2015 aerial surveys.

Public Land Recommendations:

1. Keep informed and participate in public land management issues/activities at the district and regional level including: Forest Plan Revisions, Fuels Reduction Plan, Timber Management Plan, Travel Management and other outreach opportunities. Provide written comments to public land managers on source water protection concerns.
2. Actively foster a collaborative relationship with U.S. Forest Service Clear Creek Ranger District, Clear Creek County, Upper Clear Creek Watershed Association and the Clear Creek Watershed Foundation, Division of Reclamation, Mining and Safety, Colorado Department of Public Health and Environment, and the Environmental Protection Agency.
3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment, mine land reclamation).

Wildland Fires

The forests throughout Colorado are dense with fuel build-up from a century of fire suppression and thus more vulnerable to high-intensity fires than it was historically. Most of Colorado's wildfires are caused by lightning strikes from the many thunderstorms that pass through the state on a regular basis during the summer months.

Wildfire/Watershed Assessment

In 2013, the Clear/Bear Creek Wildfire/Watershed Assessment was completed which was designed to identify and prioritize sixth-level watersheds based upon their hazards of generating flooding, debris flows and increased sediment yields following wildfires that could have impacts on water supplies. A combination of ruggedness and road density (miles of road per square mile of watershed area) was used to assess the flooding or debris flow hazard portion of the analysis.

The Assessment analysis resulted in a hazardous ranking of one through five, with five being the highest ranking of the existing forest conditions. The Chicago Creek outlet and Soda Creek watersheds were ranked 5 for wildfire hazard and an overall composite hazard ranking of 5.4 and 5.5 due to the flooding/debris flow potential and soil erodability post-fire (Fig. 20) (JWA, 2013). Information from this assessment could be used to identify areas to incorporate forest management treatments that could minimize adverse hydrologic responses following intense wildfires.

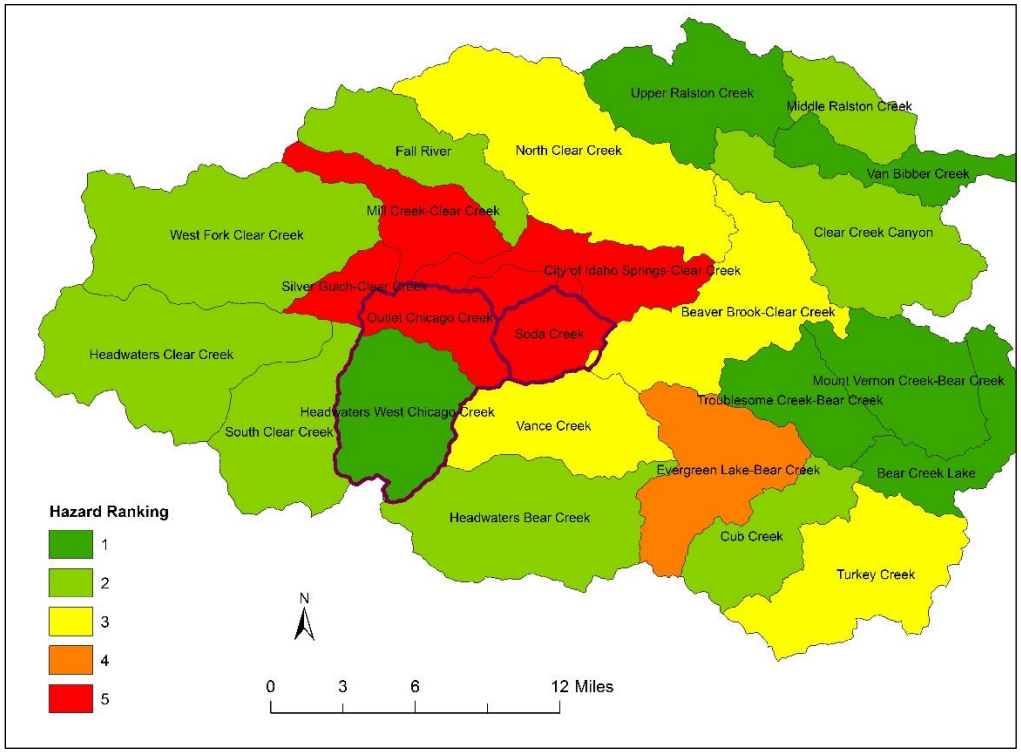


Figure 20. Map of Composite Hazard Ranking in the Chicago/Soda Creek watersheds.

Community Wildfire Protection Plan

In 2008, Clear Creek County completed their Community Wildfire Protection Plan that identifies strategies for the community and land managers to implement to reduce the impacts of wildfire to the community and maintain a healthy watershed. The Plan identifies measures that can be taken to mitigate the impact of catastrophic wildfire by reducing the fire behavior potential in areas of highest risk (CCCCWPP, 2008).

Water Quality Effects from Fire

The degree to which wildfire degrades water quality and supply depends on wildfire extent and intensity, post-wildfire precipitation, watershed topography, and local ecology. Potential effects of wildfire on municipal water supplies and downstream aquatic ecosystems include the following:

- Changes in the magnitude and timing of snowmelt runoff, which influence filling of water-supply reservoirs,
- Increased loading of streams by nutrients (nitrogen and phosphorus), dissolved organic carbon (DOC), major ions, and metals,
- Post-fire erosion and transport of sediment and debris to downstream water-treatment plants, water-supply reservoirs, and aquatic ecosystems, and
- Changes in source-water chemistry that can alter drinking water quality (Writer & Murphy, 2012).

Variable source-water quality presents challenges for drinking-water providers. Drinking-water treatment processes operate more effectively when source-water quality is constant, DOC concentrations are below 5 milligrams per liter (mg L–1), and turbidity (an indicator of suspended material) is less than 20 nephelometric turbidity units (NTU). Elevated nitrate concentrations can promote algal growth in water supply reservoirs, which can increase DOC concentrations and lead to disagreeable taste and odor (Writer & Murphy, 2012).

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Post-fire impacts to water quality occurred during “first flush” storm events, snowmelt, and high intensity thunderstorms. Thunderstorms can transport substantial amounts of sediment and debris from hillslopes of the burned area into the source waters. Even if the City of Idaho Springs’s water treatment is capable of removing the sediment, operational costs may increase and could require more advanced treatment technologies if sediment levels stay too high.

Wildland Fire Recommendations:

1. Refer to the Clear Creek County Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report as guides to understand wildfire risks and measure that may reduce risk.

2. Share maps, GIS shapefiles, and Emergency Notification Cards with the USFS and County.

Flooding

Flooding was considered by the Steering Committee to be a moderate risk for creating an impact to the City of Idaho Springs's water system. Flooding occurs when soils become saturated from prolonged rains and/or snowmelt runoff during spring months. If runoff or rain continues, water begins to accumulate faster than it can be absorbed or carried away in stream channels, stream levels begin to rise and eventually overflow the normal stream channel. A general flood event occurs over a minimum period of at least a few hours and can take days to reach flood crest height as seen with the September 2013 flooding along the Front Range of Colorado. A flash flooding event is usually short in duration and can happen so fast that little warning can be given. Flash flooding can also occur from upstream dam failure.

A peak flow on Chicago Creek of 275 cubic feet per second (cfs) was recorded in 1995. Average flows for the years 1995-1999 averaged 24.7 cfs. There is no stream flow data for more recent years, as the gauge was decommissioned in 2010.

The potential for flooding can change and increase through various land use changes (human activity) and changes to land surface (wildfires). Wildfires create hydrophobic soils, a hardening or "glazing" of the earth's surface that prevents rainfall from being absorbed into the ground, thereby increasing runoff, erosion, and downstream sedimentation of channels (RCCWPP, 2010). Climate-driven changes to the hydrological system may likely increase the frequency, magnitude, and cost of extreme weather events.

City of Idaho Springs Floodplain

Portions of Chicago Creek upstream of the water treatment plant lie within the floodplain. Floodplain refers to the 100-year floodplain which is a term used by the Federal Emergency Management Agency (FEMA) and refers to lands adjacent to a waterway that have at least a one percent change of being covered by a flood in any one year. This also means that there is a 100% chance that these lands will experience flooding over a 100-year period. The 100-year flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program. The City has included in their Municipal Code the adoption of FEMA floodplain regulations with reference to the July 17, 2012 Flood Insurance Rate Map (FIRM).

Flooding Recommendations:

1. Continue to periodically update the City's floodplain regulations to keep them current with FEMA standards. Support and enforce regulations that limit development within the 100-year floodplain.
2. Include flood preparedness and an evacuation plan in the County's Emergency Response Plan.
3. Refer to the Clear Creek County Hazard Mitigation Plan.

Dam Failure

The State's Dam Safety Program is administered by the Colorado Division of Water Resources' Dam Safety Branch. The branch carries out two principal duties of the State Engineer: to determine the safe storage level of reservoir dams in the state and to approve plans and specifications. The branch conducts scheduled dam safety field inspections of existing dams.

There is no specific evidence to indicate the likelihood of dam failure within the County. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which result in overtopping
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, piping, or rodent activity
- Improper design, maintenance or negligent operation
- Earthquake
- Upstream dam failure

Dam safety and dam failure is a concern to the City of Idaho Springs, which lies directly downstream along Clear Creek. There are five reservoirs/lakes in the source water protection area. The Idaho Springs Reservoir is a high hazard class dam (CCCHMP, 2016).

Dam Failure Recommendations:

1. Monitor conditions of the dams and obtain reports from the State's annual inspection.

Reservoir Maintenance

There are five reservoirs/lakes in the City of Idaho Springs' source water protection area, all located within the Chicago Creek watershed (Table 7).

Table 7. Table of Reservoir/Lakes and Owners in the Source Water Protection Area.

Reservoir/Lakes	Owner/Manager
Idaho Springs Reservoir	City of Idaho Springs
Lower Chicago Lake	USFS
Upper Chicago Lake	USFS
Edith Lake	Lake Edith Imp Co - Private
Echo Lake	Denver Mountain Parks

Reservoir managers are responsible for conducting maintenance activities at the reservoirs, as well as pipelines. Maintenance activities may include removing silt and debris upstream of a dam, dam or spillway repairs, clearing shoreline vegetation, removing nuisance aquatic and shoreline vegetation, managing eutrophication, dredging to restore depth, and other in-lake work. Any of these activities may include partial or complete drawdown of the reservoir. Pipelines can develop leaks, which will also require repair and/or replacement.

If the maintenance work is not conducted properly, there can be short-term or long-term damage to wetlands, streams or ponds, floodplain, fisheries, state and federal rare and endangered species habitat, drinking water sources, and other resources.

Releasing sediment-laden waters downstream can lower water quality below standards and affect fisheries and wildlife habitat. Increasing turbidity can also interfere with disinfection at water supplies downstream. Releasing too much water too fast or with precipitation events and intense snowmelt can damage public and private property (including homes and roadways) and can affect water users.

Sediment management efforts to control upstream erosion and pollution in the watershed will help to improve downstream water quality and reduce the need for dredging downstream reservoirs.

Reservoir Maintenance Recommendations:

1. Implement stormwater BMP's to decrease sedimentation to the reservoirs and downstream waterways.

2. Monitor reservoir and stream gauge levels to minimize impacts from high water events on downstream water utilities, city, and residents along the riparian corridor.

Weed Abatement

Herbicides are used by Clear Creek County and the U.S, Forest Service to control noxious weeds within the source water protection area. The Clear Creek County Weed Program works to control noxious and nuisance weeds on county road rights of way, educate the public on weed management, and provide weed control in cooperation with other land management agencies. The County Weed Supervisor is responsible for implementing the County Weed Program. This is consistent with the State mandate for managing noxious weeds. The Clear Creek County Weed Program uses chemical and biological methods to manage, control, and eradicate noxious weeds. Chemical control methods change while the weeds can become resistant to chemicals. Consistency is the best method for long-term and successful eradication of noxious weeds.

Certain noxious weeds in the County that are on the State's List A are required to be eradicated (destroyed). These include Cypress spurge, Myrtle spurge and Orange hawkweed. Noxious weeds in the County on List B are treated chemically with herbicides, but may also be controlled mechanically. The remaining noxious weeds on List C are recommended for voluntary management (CCC, 2015).

The County uses herbicides with the lowest rates recommended for effective weed control that have the lowest toxicity and volatility, and are spot sprayed whenever possible, instead of broadcast on weed infestations. Almost all herbicides used are selective for control of broadleaf weed species. Grasses are unaffected.

All employees in the weed group, full-time and seasonal, are certified with the Colorado Department of Agriculture under Pesticide Application. Application equipment is regularly calibrated to insure accurate delivery. Herbicide label information provides precautionary information relating to proximity to water, sensitive vegetation, re-entry intervals, etc. Product labels are referenced and present with applicators in the field.

Improper use of herbicides may lead to contamination of ground and surface water supplies for drinking water. These chemicals can enter the water source through direct application, runoff, and wind transport or drift. The goal is to prevent contamination of water supplies the using best management practices in the application and use of these chemicals.

Weed Abatement Recommendations:

1. Provide the County weed manager with a copy of the Source Water Protection Plan, a map of the source water protection area and location of water intakes. Encourage the use of non-herbicidal alternatives in a 50-foot buffer zone around drinking water intakes, ditches, and streams.

Septic Systems

Within the Source Water Protection Area, and more specifically within 1000' upstream of the city's intake, there are few properties that rely on septic systems to dispose of their sewage. A septic system is a type of onsite wastewater treatment system (OWTS) consisting of a septic tank that collects all the sewage and a leach field that disperses the liquid effluent onto a leach field for final treatment by the soil (Fig. 21).

Septic systems are the second most frequently cited source of groundwater contamination in our country. Unapproved, aging, and failing septic systems have a large impact on the quality and safety of the water supply. The failure to maintain a septic tank can cause untreated wastewater to back up into the home, to surface on the ground, or to seep into groundwater. Improper management can contribute excessive pollutants to the groundwater.

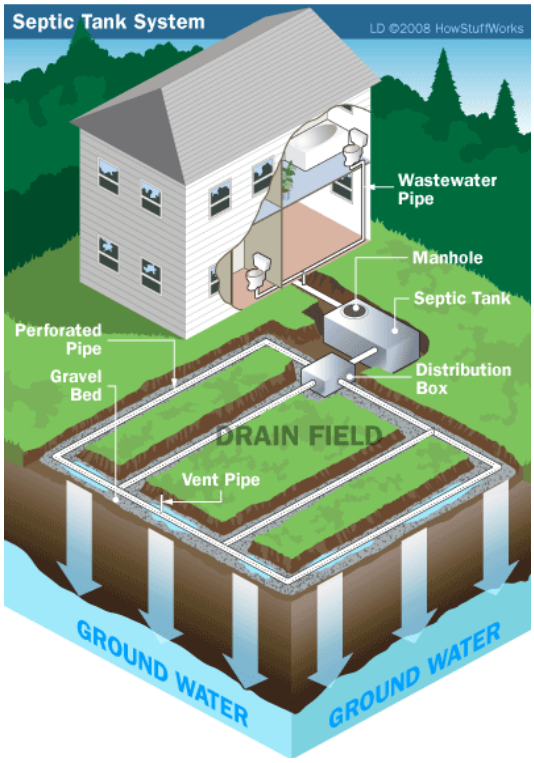

Figure 21. Septic systems are the second most frequently cited source of ground water contamination in our country.

Regulations and Permitting

In 2014, the Clear Creek County Board of Health adopted the Clear Creek County Onsite Wastewater Treatment System Regulations (See Appendices). These regulations were derived from Regulation #43, which was adopted, by the state of Colorado in 2013. The County's Environmental Health Department administers and enforces the minimum standards, rules and regulations; and issues permits for the OWTS.

Septic System Recommendations:

1. Educate property owners within the SWPA on the source water protection plan, the proper use and maintenance of their septic system and how the source of their drinking water can be affected by an inadequate functioning septic system.
2. Encourage the County Environmental Health Department to educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.

Permitted Dischargers

There are two wastewater discharge sites within the source water protection area. These facilities are permitted under the CDPHE National Pollutant Discharge Elimination System (NPDES) regulation. The Water Quality Control Division issues and administers discharge permits and other control mechanisms as provided by the Colorado Water Quality Control Act.

One of the permits is for a construction discharge permit under the name of Nomadic LLC, which is on Highway 103 near the nine-mile marker. The other is Camp Shwayder, that has a small wastewater treatment plant which is operated June-September. It is permitted for a discharge of 9,000 gallons per day.

Permitted Dischargers Recommendations:

1. Provide Emergency Notification Information to the upstream WWTF operators and request notification of emergency upsets and spills.

Storage Tanks

Spills from leaking underground storage tanks (LUST) or above ground storage tanks (AST) that contain petroleum products can contaminate the groundwater and present other hazards. There is record of three storage tanks in the SWPA, all of which are now inactive. Two of them had confirmed releases in the early to mid-90's. One identified as "Idaho Springs Rclr" had a confirmed release in 1995 and was closed in 1996. The Mt. Evans Observatory had a confirmed release in 1993 and LUST cleanup in 1996. The third was a Federal Aviation Administration facility that had an underground storage tank closed in 1995 (COSTIS, 2016).

SOURCE WATER PROTECTION MEASURES

Best Management Practices

The Steering Committee reviewed and discussed several possible best management practices that could be implemented within the Source Water Protection Area to help reduce the potential risks of contamination to the community's source water. The Steering Committee established a "common sense" approach in identifying and selecting the most feasible source water management activities to implement locally. The focus was on selecting those protection measures that are most likely to work for the community. The best management practices were obtained from multiple sources including: Environmental Protection Agency, Colorado Department of Public Health and Environment, Natural Resources Conservation Service, and other source water protection plans.

The Steering Committee recommends the best management practices listed in Table 8, "Source Water Protection Best Management Practices" be considered for implementation by:

- City of Idaho Springs
- Clear Creek County
- U.S. Forest Service Clear Creek Ranger District
- Clear Creek Fire Authority
- Upper Clear Creek Watershed Association
- Clear Creek Watershed Foundation
- Colorado Division of Reclamation, Mining and Safety
- Colorado Rural Water Association
- Visitors to the Source Water Protection Area

Evaluating Effectiveness of Best Management Practices

The City of Idaho Springs is committed to evaluating the effectiveness of the various source water best management practices that have been implemented. The purpose of evaluating the effectiveness of the source water best management practices is to update water system managers, consumers, and other interested entities on whether or not the intended outcomes of the various source water best management practices are being achieved, and if not, what adjustments to the Source Water Protection Plan will be taken in order to achieve the intended outcomes. It is recommended that this Plan be reviewed at a frequency of once every 1-3 years or if circumstances change resulting in the development of new water sources and source water protection areas, or if new risks are identified.

The City of Idaho Springs is committed to a mutually beneficial partnership with the Colorado Department of Public Health and Environment in making future refinements to their source water assessment and to revise the Source Water Protection Plan accordingly based on any major refinements.

Table 8. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
Transportation	1. Educate the public on how to respond to hazardous spills and dumping by calling "911". This can be done with signage on the roads entering the protection area along with information in a public brochure distributed to residents and visitors in the protection area. Obtain approval from County Planning Department prior to constructing "Drinking Water Protection Area" signage on roadways.	City of Idaho Springs Clear Creek County Clear Creek Ranger District
	2. Work with local emergency response teams to ensure that any spill within the protection area can be effectively contained and proper protocols are followed for clean-up of hazardous materials spilled within the transportation corridors. Refer to the County Emergency Management Plan.	City of Idaho Springs Clear Creek County
	3. Keep informed on road maintenance practices and schedules within the SWPA.	
	4. Provide a copy of the Source Water Protection Plan and map of the SWPA to Clear Creek County Road and Bridge Department, U.S. Forest Service Clear Creek Ranger District, Clear Creek Fire Authority, and Clear Creek County Office of Emergency Management (OEM).	City of Idaho Springs
	5. Request to be notified by Clear Creek County (OEM) when a hazardous spill occurs within the SWPA.	City of Idaho Springs
	6. Consider the purchase small spill kits to be used by utility, managers, and responders within the SWPA.	City of Idaho Springs
Wildland Fires	1. Refer to the Clear Creek County Community Wildfire Protection Plan and Watershed/Wildfire Assessment Report as guides to understand wildfire risks and measure that may reduce risk.	City of Idaho Springs
	2. Share maps, GIS shapefiles, and Emergency Notification Cards with the USFS and County.	City of Idaho Springs

Table 8. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
Reservoir Maintenance	1. Implement stormwater BMP's to decrease sedimentation to the reservoirs and downstream waterways. 2. Monitor reservoir and stream gauge levels to minimize impacts from high water events on downstream water utilities, city, and residents along the riparian corridor.	City of Idaho Springs City of Idaho Springs
Flooding	1. Continue to periodically update the City's floodplain regulations to keep them current with FEMA standards. Support and enforce regulations that limit development within the 100-year floodplain. 2. Include flood preparedness and an evacuation plan in the County's Emergency Response Plan. 3. Refer to the Clear Creek County Hazard Mitigation Plan.	City of Idaho Springs Clear Creek County Clear Creek Fire Authority
Dam Failure	1. Monitor conditions of the dams and obtain reports from the State's annual inspection.	City of Idaho Springs
Land Use Planning and Growth	1. Provide Clear Creek County with a copy of the SWPP and GIS mapping information of the SWPA and encourage them to overlay this area on their land use maps. 2. Request to be notified by Clear Creek County officials of land use hearings or meetings regarding land within the SWPA to have the opportunity to participate in the process (i.e. formal agreement, MOU between City and County. 3. Offer assistance on revisions to the Idaho Springs City Council on their Watershed protection Ordinance.	Colorado Rural Water Association City of Idaho Springs Colorado Rural Water Association

Table 8. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
Public Land Management	1. Keep informed and participate in public land management issues/activities at the district and regional level including: Forest Plan Revisions, Fuels Reduction Plan, Timber Management Plan, Travel Management and other outreach opportunities. Provide written comments to public land managers on source water protection concerns.	City of Idaho Springs Clear Creek Ranger District
	2. Actively foster a collaborative relationship with U.S. Forest Service Clear Creek Ranger District, Clear Creek County, Upper Clear Creek Watershed Association and the Clear Creek Watershed Foundation, Division of Reclamation, Mining and Safety, Colorado Department of Public Health and Environment, and the Environmental Protection Agency.	City of Idaho Springs
	3. Support efforts to improve watershed conditions (i.e. fuels reduction activities, wildfire assessment and mine land reclamation).	City of Idaho Springs
Municipal Utilities	1. Inspect and protect source water intakes; be knowledgeable of the emergency response plan, and provide Information concerning the SWPP and implementation measures in the annual Consumer Confidence Report (CCR).	Idaho Springs Water Operator
	2. Conduct water quality monitoring according to a monitoring plan.	Idaho Springs Water Operator
	3. Implement emergency response plan (ERP) in the event of a disruption in the water source.	City of Idaho Springs

Table 8. Source Water Protection Best Management Practices

Issue	Management Approach	Partners
Septic Systems	1. Educate property owners within the SWPA on the source water protection plan, the proper use and maintenance of their septic system, and how the source of their drinking water can be affected by an inadequately functioning septic system. 2. Encourage the County Environmental Health Department to educate property owners when they apply for a septic permit on the link between good septic practices and protecting groundwater.	City of Idaho Springs Clear Creek County City of Idaho Springs
Mining	1. Stay informed and participate in collaborative efforts underway to mitigate impacts from mining within the SWPA 2. Continue to evaluate water quality monitoring data to characterize the effects of mined land reclamation activities and impacts of abandoned mine lands. 3. Develop a baseline of water quality data for Chicago and Soda Creeks. Consider participating in the RiverWatch program (or other) to monitor the water quality of Chicago and Soda Creeks. 4. Get involved in the review process for new mining activity permits at the State and County level including unpatented claims on both public and private lands.	City of Idaho Springs Clear Creek County City of Idaho Springs City of Idaho Springs City of Idaho Springs
Weed Abatement	1. Provide the County weed manager with a copy of the Source Water Protection Plan, a map of the source water protection area and location of water intakes, ditches, and streams.	City of Idaho Springs

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APPENDICES

A. Emergency Response Plan*

B. Source Water Assessment Report and Appendices

C. Meeting Agendas and Presentations

D. Contact List of Stakeholders Invited to Participate

E. Citizen Guides

F. Contaminant Health Concerns

G. Additional Resource

H. Funding Sources for Source Water Protection

I. Glossary

*Notice: This public document will only include information that is not deemed sensitive to the safety and operation of the individual community's water plan operation. Appendices marked with a * are only included in the Public Utility's report or kept on file at their office. All other documents are included on the CD located in the back pocket of this report. All documents can be reprinted.*